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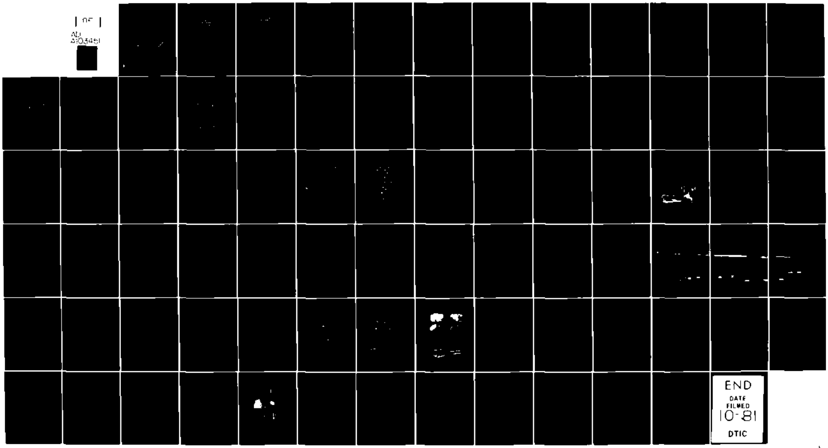

Little Caney River Prehistory (Copan Lake):

1978 Field Season

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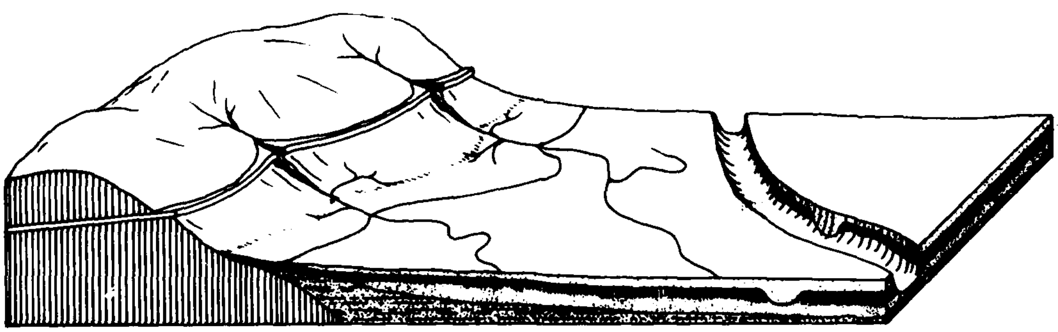

Terry J. Prewitt

LITTLE CANEY RIVER PREHISTORY (COPAN LAKE): 1978 FIELD SEASON

LEVEL II

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LITTLE CANEY RIVER PREHISTORY (COPAN LAKE): 1978 FIELD SEASON

Terry J. Prewitt

Illustrations
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UNIVERSITY OF TULSA

COPAN LAKE PROJECT
DACW56-77-C-0228

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CONTRIBUTIONS IN ARCHAEOLOGY 7

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INTRODUCTION

During the Summer and Fall of 1978 the University of Tulsa, Laboratory of Archaeology conducted an investigation of five archaeological sites in the area of Copan Lake, now under construction along the drainage of the Little Caney River between its confluence with the Caney River and the town of Caney, Kansas ~~(Figure 1)~~. The investigation represented Phase II of a multi-year project funded by the U.S. Army Corps of Engineers, Tulsa District Office, ~~under contract~~ DA-77-C-0228 between the Corps of Engineers and the University of Tulsa.

Phase II fieldwork at Copan Lake included the excavation of three sites (Sites 34WN30, 34WN64, 34WN68) and test excavation of two additional sites (Sites 34WN32, 34WN69). The bulk of fieldwork was conducted during late June through August, although limited additional work was carried out during the months of October and November. The sites studied represent a number of different kinds of activity or occupancy, as part of continued emphasis of paleoenvironmental reconstruction and settlement systems analysis for the Little Caney drainage. The incorporation of the work with prior investigations by the Laboratory of Archaeology (Henry, 1977a; Keyser and Farley, 1979) and other institutions (Rohn and Smith, 1972; Vaugh, 1975; Vehik and Pailes, 1978) should strongly aid in the development of a refined prehistory of the region, especially the ecotonal area generally referred to as the Cross-Timbers (see also Henry, 1977b, 1977c, 1978).

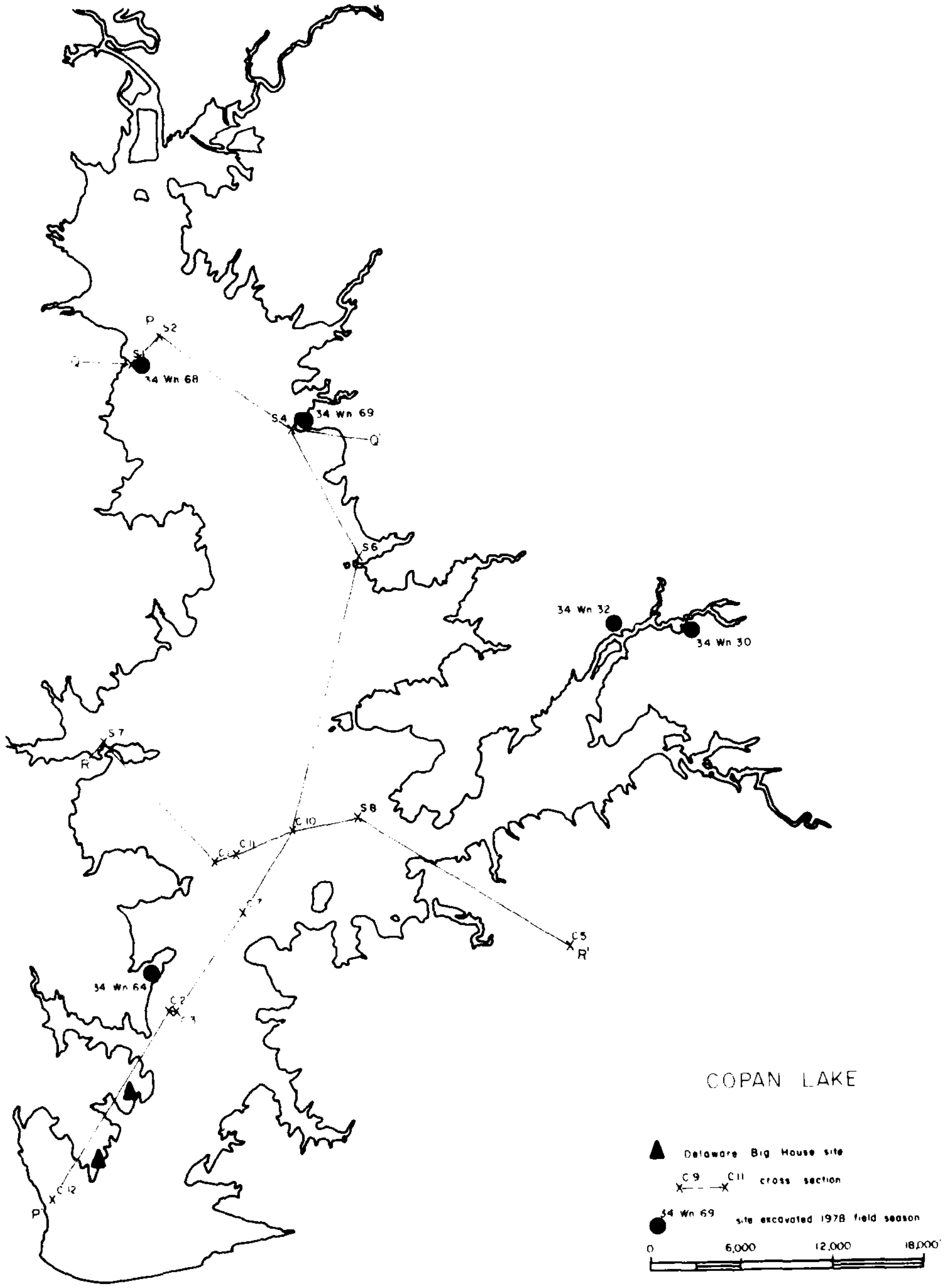


FIGURE 1: Sites and localities studied in the Copan Lake area during the 1978 investigations.

Physiography and Environment

General features of the physiography and environment of the Little Caney Valley have been discussed in earlier reports in this series (Henry, 1977a; Keyser and Farley, 1979). It seems appropriate, then, not to review such information in detail in this report. However, a brief survey of a number of observations on the physiography and environment of the valley may serve as introduction to specific reports of this year's investigations. The 1978 studies of geologic relationships in the valley enable considerable refinement of the picture presented by Hall (1977), and corroborate climatic inferences drawn from studies of other localities in the immediate region (Henry, 1978).

The Little Caney River is a second-order tributary of the Verdigris River. It flows south from southern Kansas through a relatively broad valley situated between north-south trending cuestas formed by resistant sandstones. Below the point where the Little Caney River joins its major tributary—Cotton Creek its floodplain is naturally constricted to a width of slightly over one mile. Also below this point the contemporary vegetation is more wooded along the margins of the valley, especially to the west. A similarly wooded situation exists along Cotton Creek particularly along its north branch, but also in the main valley toward its confluence with the river. It is in these two areas—along or adjacent to the constricted portion of the main channel of the Little Caney and along Cotton Creek—that most of the recorded archaeological sites in the Copan Lake area are located.

On the north end of the Copan Lake area the valley bottoms and adjacent uplands are still in use for agricultural purposes. Copse zones are restricted to the ridgecrests, and by no means provide the woodland impression of the south end of the area. Of course, immediately adjacent to the river and major tributary channels are associations of the Elm-Ash-Cottonwood forest. The change from generally forested valley margins to more open prairie conditions is not entirely a result of farming activity, however, for it is accompanied by a difference in relief. The true cuestas which produce some major rock shelters on the southern end of the Copan Lake area give way to more subtle ridges to the north. The west side of the valley has a sharper relief than the east side, but the overall terrain is better described as "rolling" than "sharply defined."

In the area north of Cotton Creek and east of the river is a rather well dissected (mature) cuesta which exhibits upland gulleying and floodplain-margin rill deposition along the Little Caney River valley. Cotton Creek receives gulley wash from the same area by way of its north branch, and the whole tributary has a great potential for dumping local sediments in the valley margin of the main channel. Under modern land usage, furthermore, restricted patches of forest act to decrease flow under normal flood conditions. This produces general sediment dumping below the confluence of Cotton Creek and the river. These areas of local heavy deposition constitute the major distribution of the buried dark clay unit which has previously been called the "Copan paleosol." In the upper Little Caney Valley section of the Copan Lake area a dark clay unit of comparable thickness occurs as a surface stratum, except along the extreme east margins of the floodplain. Thus, the slowly aggrading or stable floodplain surface of the upper valley correlates with the buried soil of the lower valley, and the burial of the Copan Paleosol is attributable to local flow conditions influencing the deposition of regionally and locally derived sediments.

Some details of these stratigraphic relationships in the Little Caney drainage system are provided in Figure 2 (measured sections are located in Figure 1). Several depositional features in the northern section of the Lake show the complexity of floodplain stratigraphic units. Near the Kansas-Oklahoma border the U-shaped channel of the Little Caney River is mostly silted over, providing only a few localities where vertical scarps show horizontally stratified deposits. Near a minor tributary which runs along the state line in Sec. 13, T29N R12E, a breakthrough point along a levee has created a deep "boilout," exposing a stratigraphic section about three meters deep from the floodplain surface (S 2). The dark clay unit at the top of this section is the same unit which overlaps the margins of the colluvial slope on which site 34WN68 is located (S 1). This floodplain unit is obscured by vertical deposition along portions of the entrenched river channel (opposite S 5, below 34WN69). On the east bank of the river at site 34WN69 a scarp has been cut into the colluvial deposits on the margin of the valley (S 5). The river bed is filled with a lag deposit which suggests that bedrock is much shallower in this part

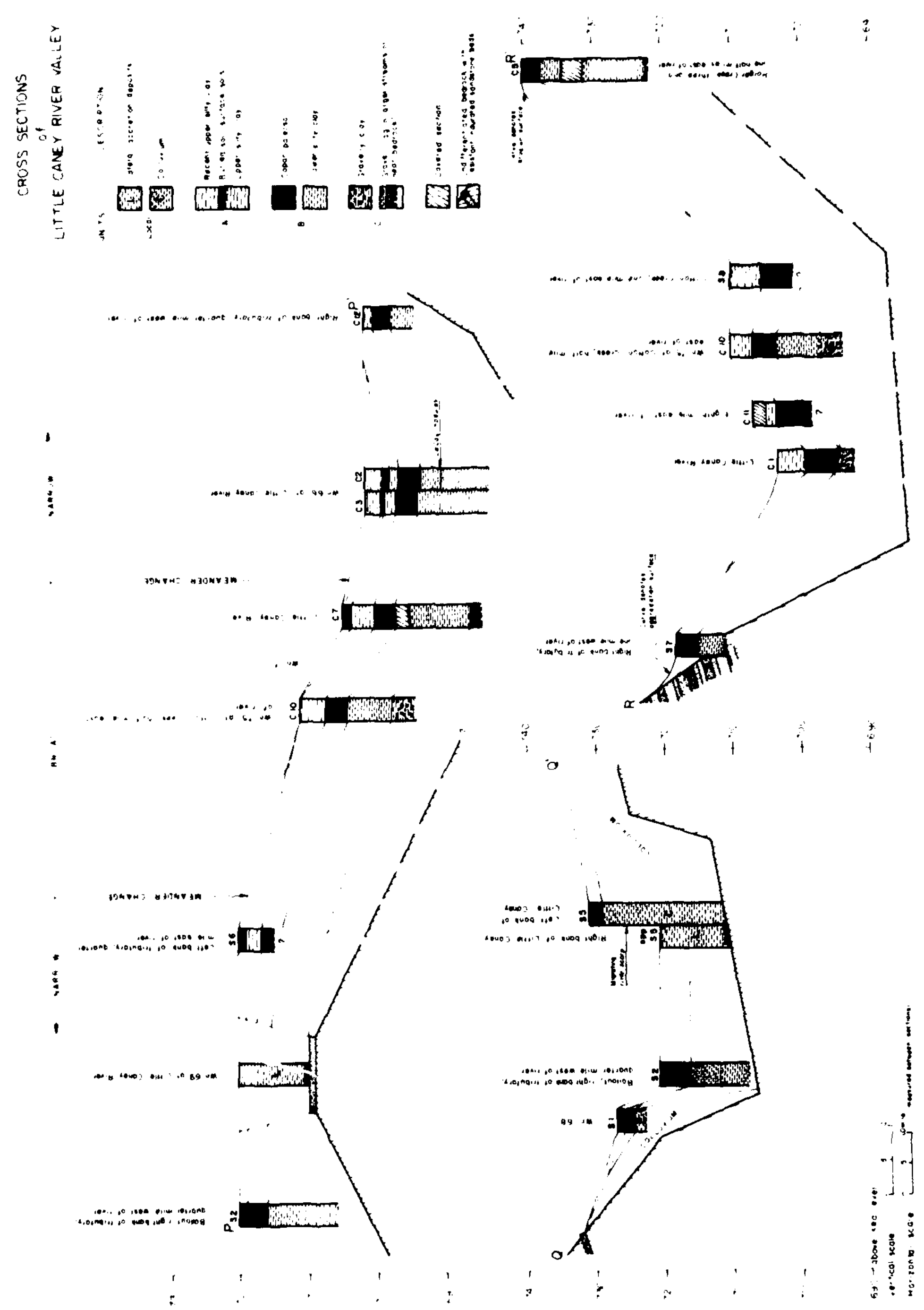


FIGURE 2. Stratigraphic relationships of measured sections in the Copan Lake area.

of the river course than other areas. This observation is consistent with the generally west-dipping orientation of rock-stratigraphic units that underlie the valley and form the cuestas on its flanks.

None of these situations provide anything similar to the measured sections of Hall (1977:34-41) or those made in related localities during this field season (S 8), most of which show the dark clay unit of the Copan paleosol. A very similar exposure is located in a minor sidestream channel only one mile south of 34WN69 (S 6). The channel drains an upland gullied area, and shows burial of the dark clay deposits of the floodplain. The depth of burial of the dark clay unit is not as great as in the Cotton Creek or other downstream areas. This suggests that the upper stratigraphic cap is derived from local colluvium rather than from regional streamload of the Little Caney River. The deeper burial of the Copan paleosol in the southern part of Copan Lake, under the primary influence of the Cotton Creek and Pooler Creek drainages, is consistent with this inference.

If the basic stratigraphic associations of Figure 2 are correct, then the process of burial of the Copan paleosol, as well as later soils (see C2 and C3), is probably associated with some local condition promoting gulleying of upland surfaces. Two major factors might have contributed to such gulleying: (1) a major climatic shift toward dry conditions, especially if accompanied by concentration of annual rainfall in a short season of very intense storms; (2) human impacts on the local biological system such as agricultural activity. It should be noted that a "dry shift" need not involve a change in annual rainfall; all that is necessary is for a radical change in the yearly rainfall distribution to occur.

The introduction of agricultural systems to the Copan Lake area has occurred within the past century, and there has undoubtedly been some major impact on Little Caney valley sedimentation as a direct result of this agricultural activity. Still, the capping unit of the local valley deposits is not wholly recent (see Hall 1977, 16-17). Subtle patterns of local dumping in the downgradient parts of the valley relate, in the main, to the period from approximately A.D. 1000 through the present. The radiocarbon date obtained by Hall (1977: 16) for Unit A of the valley depositional system (848± 62, SMU 365) certainly supports this chronologic inference. Moreover, the overall paleoclimatic picture drawn here parallels the indications through pollen and terrestrial snail data from the Hominy Creek valley which indicate the onset of drier conditions in that area during the ninth century A.D. (Henry, 1978:89).

Block diagrams of the basic depositional sequence in the Copan Lake area for the past several thousand years are shown in Figure 3. Figure 3a and 3b depict the early floodplain depositional stages and the situation in which 34WN68 was established as a site in the valley. Figure 3c depicts the stratigraphic and landform associations of the valley during the formation of the Copan Paleosol. The occupancy of 34NW30 occurred during the time that the soil unit was active throughout the valley. Figure 3d depicts the contemporary stratigraphic and land form associations of the lower portions of the valley today, so it may be paired with 3c also in the special sense that the upper valley does not have its long-term soil development buried by recent deposition. That is, Figure 3c and 3d may be thought of as ideal representations of the northern and southern ends of the valley, respectively, as they appear at present.

Contemporary vegetation in the Little Caney Valley is distributed according to the topographic and soil differences of the upper and lower zones of the drainage region, again represented roughly by Figure 3c and 3d, respectively. In the zone characterized by subtle relief and a relatively wide valley (Figure 3c), the floodplain is mainly committed to agriculture. There is some suggestion, based upon the completeness of clearing and the surrounding highland biota, that the most recent plant associations prior to the introduction of agriculture were those of the Bluestem Prairie, with Elm-Ash-Cottonwood forest occupying only the immediate flanks of the river and major tributary channels. On the ridge crests of the upland flanks in this zone there are small, thick stands of Cross Timbers associations surrounded by open grasslands. The downgradient limits of this open zone are slightly above the confluence of the Little Caney River and Cotton Creek, between the measured sections of S6 and C10 shown in Figure 2.

Below a rather rapid gradient drop in the middle zone of the Copan Lake area, in the area of the Copan Paleosol (Figure 3d), the plant associations show greater variety, and there has been somewhat less direct modification of the valley through clear-

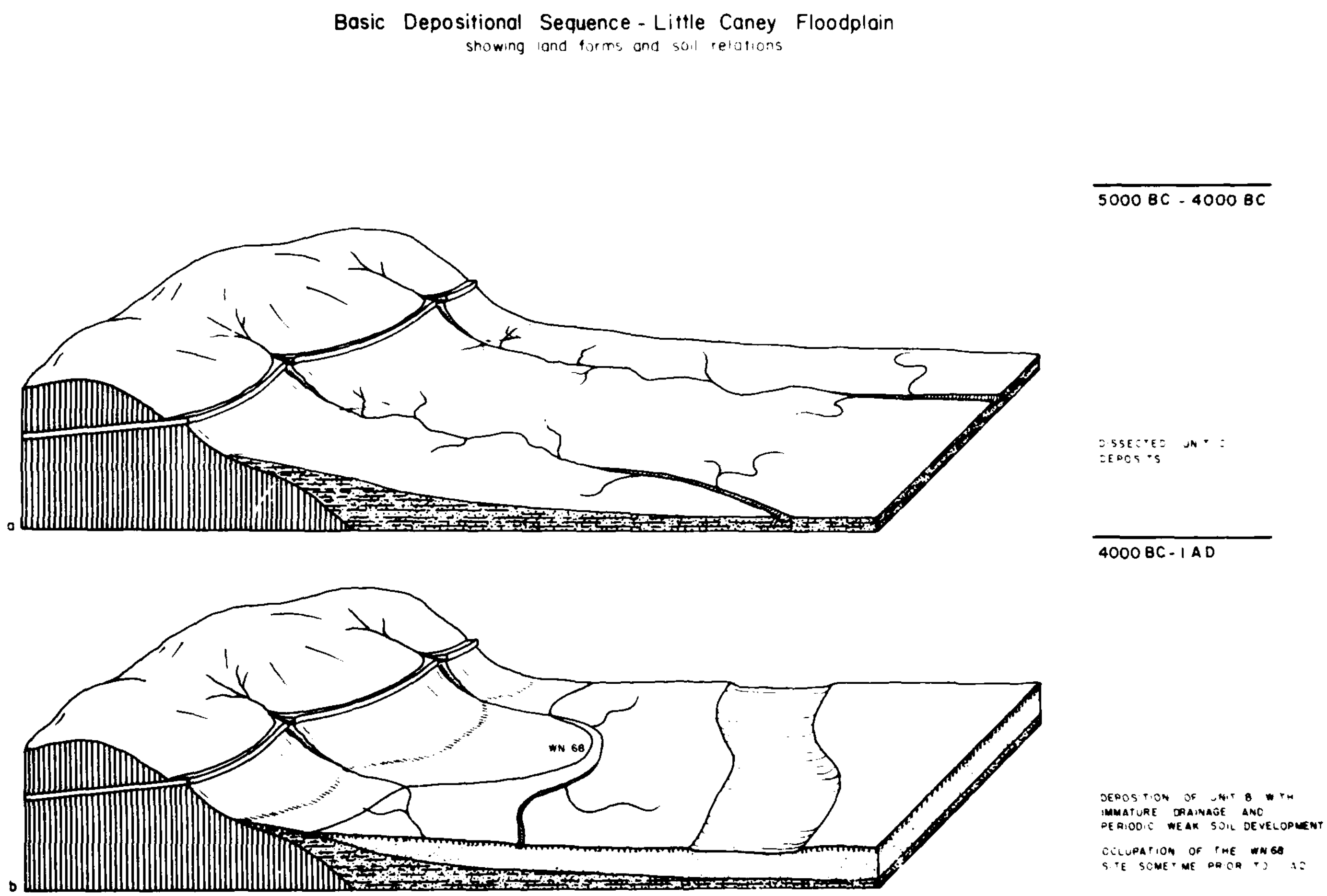
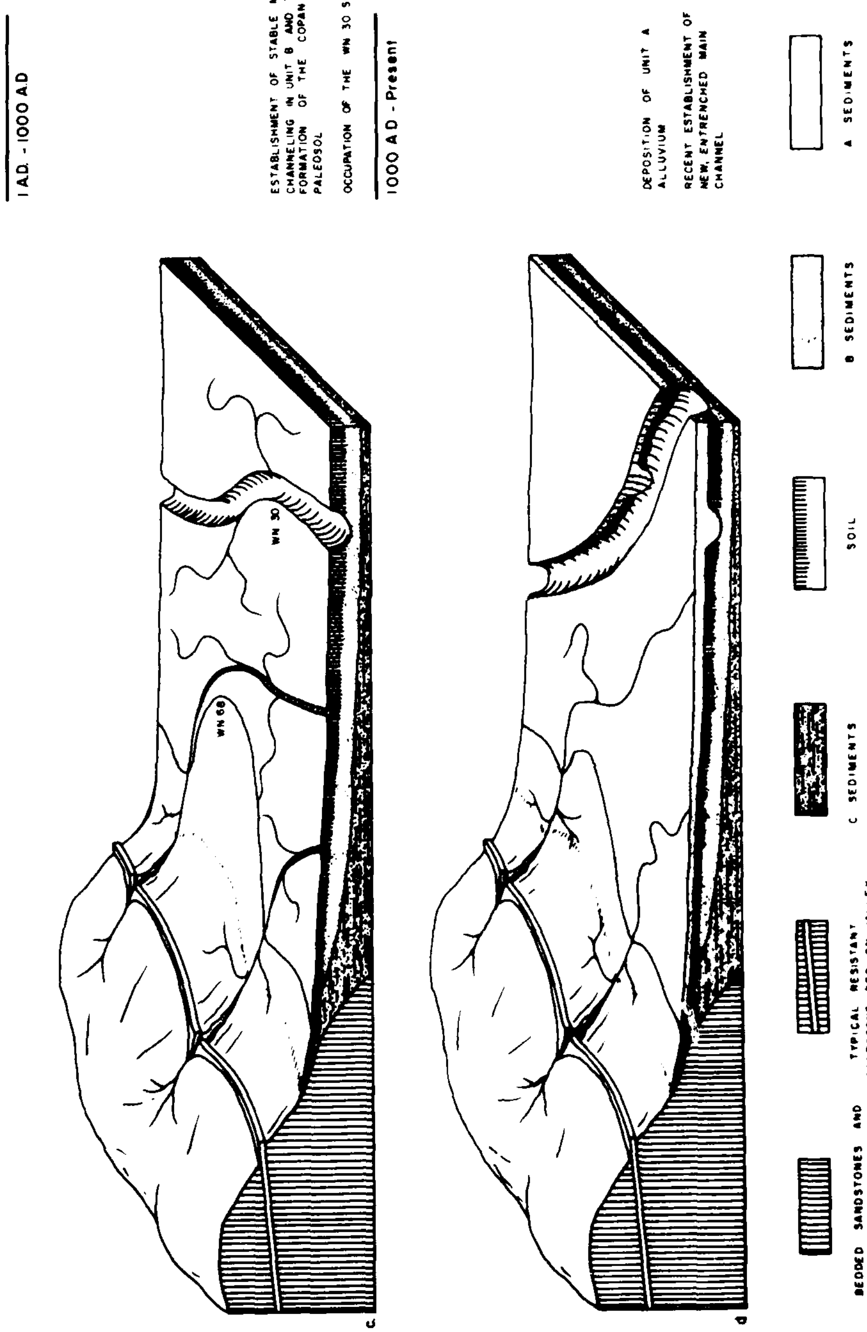


FIGURE 3: Basic Depositional Sequence - Little Caney Floodplain showing land forms and soil relations


1 A.D. - 1000 AD
ESTABLISHMENT OF STABLE MAIN CHANNELING IN UNIT B AND THE FORMATION OF THE COPAN PALEOSOL
OCCUPATION OF THE WN 30 SITE
WN 30
WN 68
c
1000 A D - Present
DEPOSITION OF UNIT A ALLUVIUM
RECENT ESTABLISHMENT OF NEW, ENTRENCHED MAIN CHANNEL
d
BEDDED SANDSTONES AND LIMESTONES
TYPICAL RESISTANT SANDSTONE BED ON VALLEY FLANKS
C SEDIMENTS
SOIL
B SEDIMENTS
A SEDIMENTS

ing. The Elm Ash Cottonwood Forest and an Oak-Hickory Forest dominate the floodplain, while the upland and Bluestem Prairie and Cross Timbers associations remain (see Keyser and Farley, 1979: 3 [Table 1], for a list of plants associated with each of these habitats; see Henry, 1977; Vehik and Pailes, 1978; and Rohn and Smith, 1972 for other discussions of environmental characteristics of the Little Caney Valley). Pollen of all these plant units have been found in archaeological and geological contexts of the valley and two reports of pollen analysis have been submitted (Hall, 1977a; Schoenwetter, 1978). There are difficulties in the interpretation of these pollen-spectra analyses stemming from (a) the primary collection of pollen from archaeological contexts and (b) the collection of pollen from different habitats within the modern valley system. Vehik and Pailes (1978: 205-6) provide a reasonable assessment of the pollen data which agrees substantially with the general geomorphic conclusions of Hall (1977a: 13-19) and this study. In any event, there does not appear to be any major deviation from the basic biotic system of today over the past 2000 years. Such a situation does not preclude some major boundary shifts of habitats in the valley, however, although there is no evidence with which one might document local shifts except during the historic period.

Archaeological and Historical Background

In many respects the analysis of artifacts from Copan Lake area sites is not related to specific cultural and geographic associations, such as "Wichita" and "Osage" on the historic level, or "Caddoan" on the prehistoric level. The analysis proceeds from data generated for broader units—Plains Village, Plains Woodland, Archaic. It is important for the reader to note that alternatives of historical connection exist for some late components, and that the range of geographic connections for prehistoric components in the Little Caney Valley is not well known at this stage of investigations. In general, the thrust of the local settlement system constructs drawn from the present analysis is toward *basic* man-land relationships and component definition, without regard to specific culture-geographic connections. At certain time periods, indeed, we may be dealing with overlapping group use of the valley which reflects common regional patterns of resource adjustment. It is doubtful, moreover, that the Little Caney Valley at any time presents the total range of functionally distinguished components produced by a particular group of people. It is highly likely that the components under present investigation represent some contemporaneous activities of particular groups, and we have sought to point out potential relations of this kind where they occur, together with evidence for such judgments.

The reader should keep in mind the several specific groups or culture-historic units to which components in the Little Caney Valley may relate. A version of the known culture-historic development of the Oklahoma-Kansas region surrounding the Copan Lake area is depicted in Figures 4 through 7. The organization is based upon cultural assessments of several other workers, and also reflects some choices of alternative unit definitions. In general, units are referenced in terms of the system in which they were originally defined (the Midwestern Taxonomic System as it has been employed in the Southern Plains—see Krieger 1946: 11). The broader units of the regional culture history are those of Willey and Phillips (1958). Most of the MTS foci brought into this discussion are conceived according to principles essentially identical to those which underlie the Willey and Phillips "phase" designation. The chronological assessments have been based upon the projections of workers most familiar with particular local manifestations, augmented by the adjusted radiocarbon series for eastern Oklahoma sites (Rohrbaugh, n.d.).

The regional interpretation suggested here begins at approximately A.D. 1 and continues through the present. Units of the Paleo-Indian and Archaic stages are not well-defined to the extent they will allow detailed treatment. Figure 4 therefore depicts the developing situation of Woodland manifestations in the Kansas-Oklahoma region. On the north, the major defined Woodland associations are those of the Kansas City Hopewell and related sites in eastern Kansas (See Wedel 1961: 88-89) and the Plains Woodland sites which have been investigated are widely dispersed and poorly integrated. The sites investigated in the Kaw Lake area have provided a general image of Plains Woodland occupancy during the period from A.D. 1 to 1000. The Kaw Lake materials suggest an intensive use of the area involving both temporary encampments and more

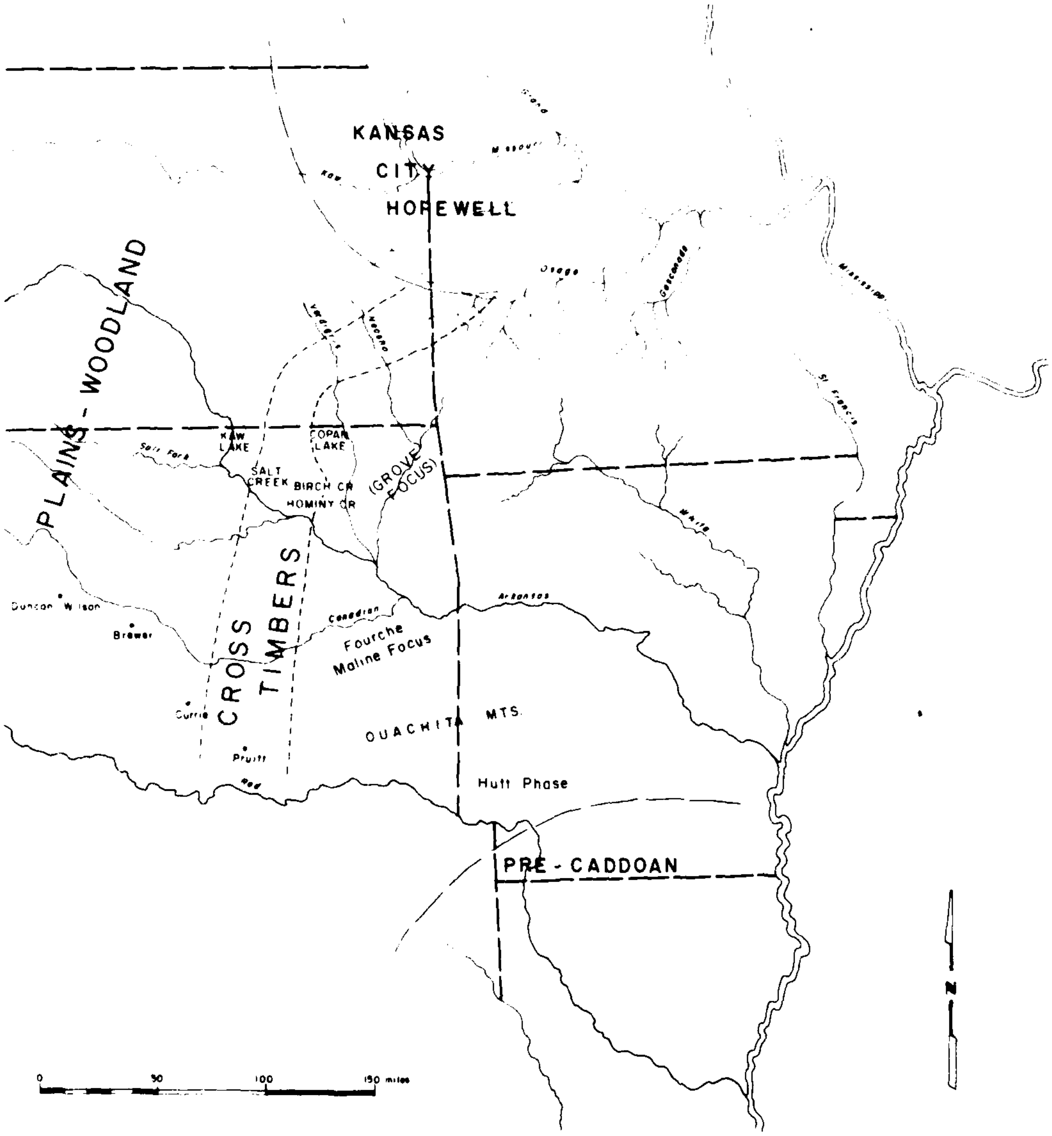


FIGURE 4: Archaeological units of the Plains-Woodland margin in the southern Plains region ca. A.D. 1-800.

permanent basecamps (See Wyckoff, 1965; Bastian, 1969; Rohrbaugh, 1973, 1974a; Hartley, 1974, 1975). The situation in the nearby Salt Creek drainage is similar, although most of the sites located so far in investigations begun in 1978 represent temporary encampments (Buehler and Vehik, 1978). These localities are west of the Cross Timbers biotic zone, although similar components have been found in the Birch Creek and Hominy Creek drainages (Henry, 1977b, 1977c, 978), and in prior investigations of Copan Lake (Vehik and Pailes, 1978; Henry, 1977a; Keyser and Farley, 1979) within and on the eastern margins of the Cross Timbers.

Plains Woodland components are sparsely represented in the literature on southwest Oklahoma and the Texas panhandle. They are confined to isolated components: the [illegible]tt site (Barr, 1966), the Duncan-Wilson Bluff Shelter (Lawton, 1968), the Lake Creek site (Hughes, 1968) and several other less well known contexts (see Hofman, 2975; Lintz, 1974). These scattered sites evidently represent a widely distributed population which ultimately gave rise to several fairly well defined cultural units after about A.D. 800 (Hofman, 1975: 45). If this is the case, then at least some of the Plains Woodland components of southwest Oklahoma represent Caddoan speakers, technically speaking "Northern Caddoan" groups ultimately identified as the Wichita. Parks (n.d.) proposes a division of North Caddoan languages into Proto-Wichita and Proto-Pawnee dialects at about 1500 to 1200 years ago, based upon an "impressionistic" evaluation of glotochronological comparison; detailed interpretation of cognate comparisons suggests a slightly earlier date near A.D. 1. These suggested dates fall within the Plains Woodland timespan.

In eastern Oklahoma at least one well defined constellation of sites is attributable to the timespan from approximately A.D. 1 through perhaps A.D. 1000. These sites were originally defined as the Fourche Maline Focus (Bell and Baerreis, 1951). Recent work in the Wister Valley has differentiated between a preceramic phase (Wister Phase) dating in the first two centuries B.C., and a ceramic phase (Fourche Maline Phase) representing the period from A.D. 1 to about A.D. 800-1000 (see Galm and Flynn, 1978: 155-6). It is evident from this work that the original Fourche Maline Focus involved multiple component sites encompassing Archaic stage materials, and also that the introduction of ceramics occurred sometime close to A.D. 1. The materials and settlement condition of the Fourche Maline Phase peoples seem generally related to developments located further east and southeast (See Hoffman, 1970: 155-6; Prewitt, 1974: 80, 86). These combined units have been referred to in the literature and informally as the Fourche Maline Culture, employing the conventions of Willey and Phillips (1958: 47-8). Although they are ultimately related to Hopewell development in the lower Mississippi Valley (specifically Marksville Culture), they seem also to be distinctive of the Ouachita Mountain area of Arkansas and Oklahoma. It is apparent also that different manifestations of the Fourche maline amalgum (including Hutt Phase in southwest Arkansas) are incorporated into or give rise to diverse patterns associated with the Caddoan archaeological area. Most important, the relationships between the Fourche Maline units and Plains Woodland groups to the west are probably comparable to those between Kansas City Hopewell (and its derivatives) and Plains Woodland groups of Kansas and Nebraska.

Figure 5, then, depicts some of the major known aggregations of people in the Arkansas River region between about A.D. 900 and the 17th century. The southern portion of the Ouachita Mountains marks the limit for the southern Caddoan archaeological area manifestations—prehistoric components relating to the Caddo proper. The differentiation of northern and southern Caddoan area development has been suggested by Bell (1972: 259-63) and seems to be reflected in recent assessments of eastern Oklahoma mortuary systems (Brown, 1966, 1971; Bell, 1972; Rohrbaugh, 1974b). These burial routines form a consistent long-term development, generally related to the kinds of systems common in the Mississippi Valley. Yet the forms of burial, and perhaps major elements of basic mortuary process, are quite distinctive when compared to the mortuary systems in the south along the Red River and its tributaries (see Webb, 1959; Skinner, *et. al.*: 1969; H. Davis, 1970). Political implications of the sequence of the northern and southern areas have been suggested (Prewitt, 1974), while the precise culture-historic connections of the Arkansas-Grand River remains of "Caddoan" association are lacking. It seems doubtful, however, that any strong link can be made between the Arkansas River "Caddoans" and

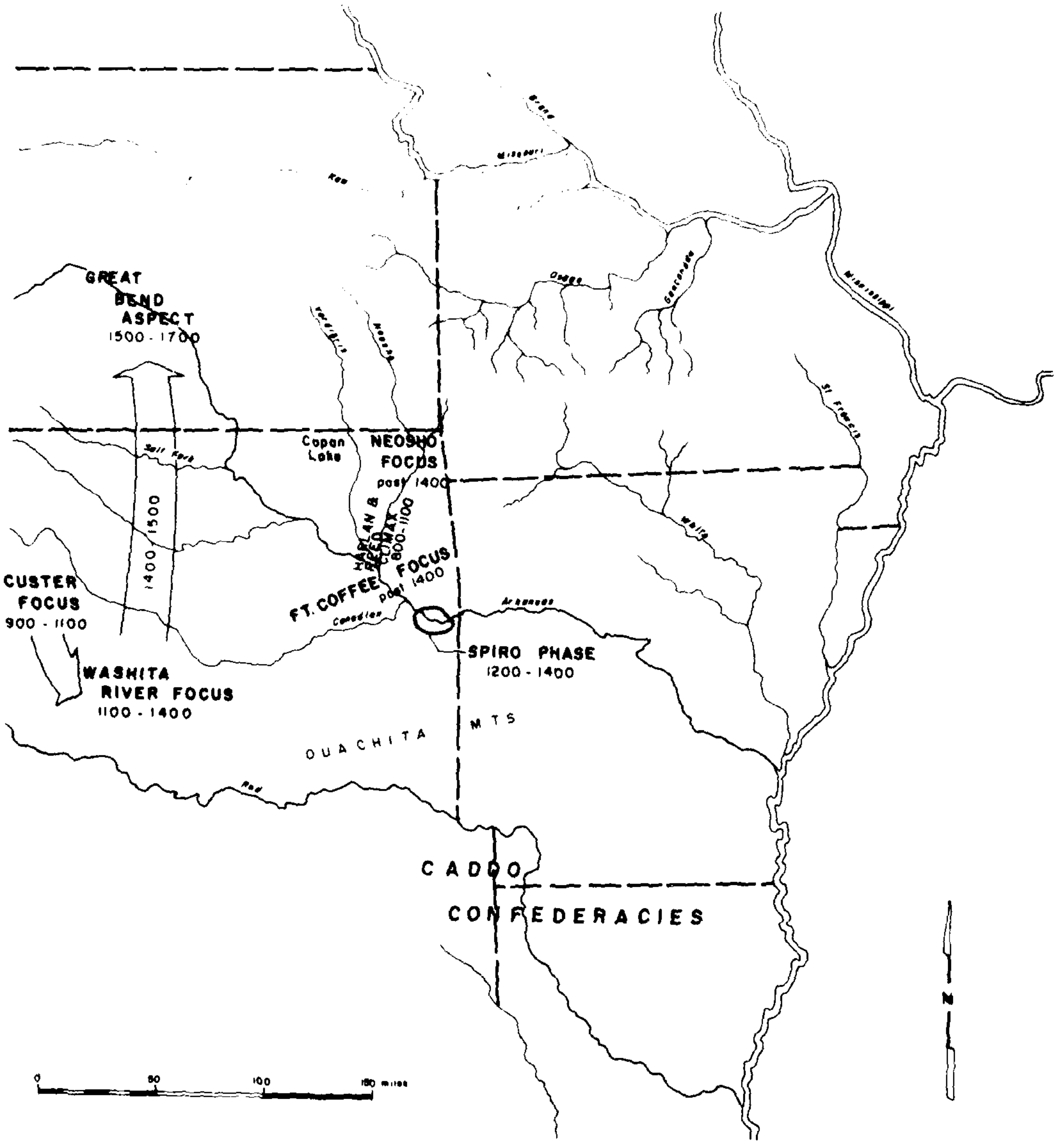


FIGURE 5: Archaeological units of the Plains-Woodland margin in the Southern Plains region ca. A.D. 800-1700.

the historic Caddo, linguistically known as Southern Caddoan speakers.

In the west, a cultural continuum has been suggested for the Custer focus and Washita River focus (Lintz, 1974; Hofman, 1975), and between the Washita River focus and Great Bend aspect (Bell, 1973) which is identified with historic Wichita speakers (Wedel, 1961: 102-108). It is evident that the Henrietta focus (Krieger, 1946) is closely parallel to the Washita River focus, but the early placement of the Kitsai in Texas (identified with Henrietta focus, see Hughes 1968, for example) presents some serious linguistic problems. The Kitsai language is most closely related to the far northern Caddoan groups (Parks, n.d.), so a position north or northeast of the probable Wichita groups seems proper. We might project a somewhat scattered population of proto-Wichita speakers on the southern Plains in Oklahoma and Texas, while identifying the Kitsai with more central Plains developments. It is possible, however, that historic Kitsai-speakers were a remnant of the Arkansas River peoples of the northern Caddoan archaeological area.

The northern Caddoan area sequence is basically divisible into three groups of archaeological units. The early unit represents the development of complex burial routines (Bell, 1972) and mound complexes along the Grand River Valley, apparently culminating sometime in the 12th century (Rohrbaugh, 1974). Although there are phase designations relating to this development as it appears in the vicinity of Spiro, for the purposes of this discussion it seems best simply to refer to the unit as the "Harlan/Reed" climax. During the timespan immediately following this early development, the wooded areas of northeast Oklahoma including the northern fringe of the Ouachita mountains came to be dominated by a well-organized chiefdom associated with the activities at the Spiro site and several minor centers surrounding it. Finally, after about A.D. 1400 the political organization of this area underwent changes through which—gradually, but perhaps never completely—the significance of the mortuary centers and the activities at Spiro in particular became overshadowed by other interests. Thus, from about A.D. 1400 into the protohistoric timespan after the late 16th century, the Neosho focus and the Fort Coffee focus represent groups who utilized the Grand-Arkansas area.

The early historic situation (Figure 6) shows the protohistoric and historic positions of the Wichita along the Arkansas and Red Rivers. The location of La Harpe's 1719 encounter with the Wichita along the lower Arkansas River in Oklahoma is not known exactly, although Mildred Wedel (1978: personal communication) places it well below the well known Deer Creek locality near Ponca City. Maps of the region from the late 17th and early 18th centuries show groups identified from the confluence of the Cimarron and Arkansas Rivers north (see Hyde, 1951: 33-6; compare the discussion of Sudbury, 1976: 79-91). The group identified as "Mento" on most of these maps have generally been linked with the Wichita speakers, but their early position in the vicinity of the Fort Coffee focus suggests possible direct continuity. Further, several 18th century maps show a group identified as Pani Blanc in southeast Kansas on the Neosho drainage, just north of the Neosho focus localities in Oklahoma (see Hyde, 1951:20). Thus, some detailed analysis of primary sources should be carried out to clarify the relationships between the "Pani" groups and the archaeological units of the region, since rather consistent references exist from which links might be developed. Such study will also contribute to the broader question of the identification of "Wichita" groups (see Bell et. al. 1967).

The detailed links with which to suggest specific identifications for the Caddoan speakers of the Arkansas-Grand drainages may be lacking, but it is somewhat easier to accout for their disappearance. Bailey (1973) has provided a summary of Osage social organization and economy for the period from the late 17th century through the 19th century. The Osage expanded their interests into the Arkansas drainage especially for the purpose of obtaining slaves (see Bailey, 1973: 34-6). The Caddoan groups were effectively blocked from trade items of European origin, especially guns, and so fell easy prey to the well armed Osage. These conditions existed until the Spanish control was firmely established in Louisiana in 1769 (Bailey, 1973:39). The Osage firmly controlled the Arkansas River Valley and its immediate tributaries in northeast Oklahoma by the 1790's, and remained in control of the valley until the Indian Removals of the 1830's.

The locations of the Osage and the eastern tribes removed to the eastern Oklahoma area (Figure 7) indicate the degree of disruption of populations associated with the Indian lands of the 19th century.

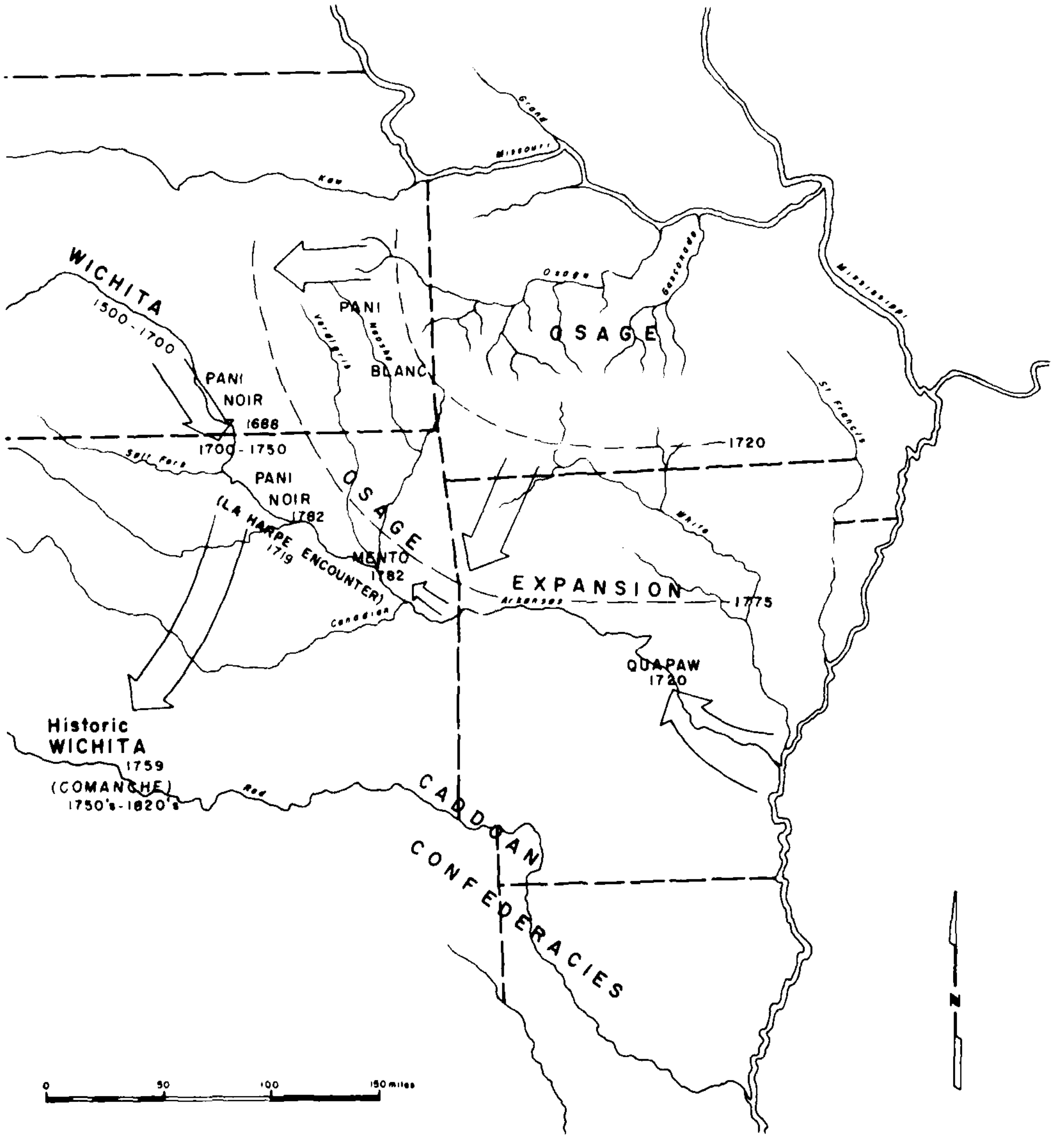


FIGURE 6: Major protohistoric group associations pertinent to the culture-historic development of the Little Caney Valley.

Osage people maintained themselves in the area of Claremore, Oklahoma, until 1839, although most Osage groups were located in southeast Kansas after 1825. In general, Osage locations were determined in accordance with agreements providing land for the eastern tribes (see McReynolds, 1964). From the 1830's through the late 1860's the northeast Oklahoma region was officially occupied exclusively by the Cherokee and Creek tribes. The Delaware were moved into Oklahoma in the late 1860's, one group going to the Anadarko area in the southwest part of the state and the other to what is now Washington County, Oklahoma, (see Weslager, 1972 for a general history of the Delaware). The Washington County Delaware were made an administrative part of the Cherokee Nation, although they maintained an independent cultural existence. Osage-Delaware relations, though strained early, have been closer in some respects than the relationship of the Delaware to the Cherokee. The Osage actually moved into the Osage County area in 1872, thus establishing the basic geographic array of Cherokee, Delaware, and Osage of the modern era.

During the early prehistoric timespans represented in the Little Caney Valley, archaeological sites probably relate to Caddoan speaking peoples. In the early 1700's however, important incursions of Osage activity in northeast Oklahoma complicate the overall picture of culture-historic assessment. Contact sites in the Little Caney drainage are lacking, but protohistoric sites have come to light during the 1978 field season. It seems probable that the refinement of the Plains Village period activities in the Little Caney Valley will show a complex picture of relations looking west toward the upper Arkansas as well as east, to the developments of the Grand River. Indeed, if there were small population enclaves in the Little Caney drainage during the 9th through 17th centuries—and at times there certainly appear to have been (Henry, 1977a; Keyser and Farley, 1979)—then part of our understanding of the meaning of particular components must lie in our ability to relate remains to one or another of these major aggregations of people. This is not to say that there were not some essentially continuous residents of the Little Caney area during Plains Village times; rather, we must simply wonder which direction they were most prominently oriented.

Yet is is unlikely that there are long-term components indicative of Osage activity in the Little Caney Valley during the protohistoric period. The Osage were strongly committed to European wares well before they entered the Oklahoma region on a permanent basis, and there are no sites which indicate such an occupancy of the Little Caney drainage during the period from the later 1700's through the 1830's. It is with the introduction of the Delaware into the locality that major Historic-Indian sites occur in any numbers. Two major sites in the Copan Lake area are the locations of the "Big House" religious observances (see Miller and Dean, 1976). Several other historic locations in the Copan Lake area relate to Delaware activities, and it is the Delaware and Cherokee population of the latter part of the 19th century who introduced farming to the Little Caney area in Oklahoma.

Goals of the 1978 Excavation

The archaeological investigations of the Little Caney Valley are oriented toward the coordination of culture-historical and paleoenvironmental studies. The 1978 excavations sought to expand our view of human activities in the valley through the investigation of several small, apparently discreet components representing limited groups of people and activities. These sites (34WN64, 34WN30, and 34WN69) were selected especially in the interest of gaining refined views of material associations within limited timespans of the Plains Woodland and Plains Village periods. Of these sites, 34WN30 and 34WN64 were intensively sounded, but 34WN69 was deferred because of logistic difficulties. The site will be tested during the coming season.

In addition, two larger sites were studied to expand our data base on cultural development and in its environmental contexts. The larger of these sites, 34WN68, was tested and provisionally related to the Little Caney Valley depositional sequence. It represents the earliest archaeological context studied to date in the Copan Lake area. The other site is a rockshelter (34WN32) with stratified deposits spanning the Plains Woodland and Plains Village periods at least through protohistoric times. Only 34WN32 yielded an appreciable quantity of faunal remains or charcoal. The faunal remains generally involve very small bone fragments and a small number of snails. Charcoal recovered from the deposits was sufficient to submit several radiocarbon samples.

These investigations directly expanded the

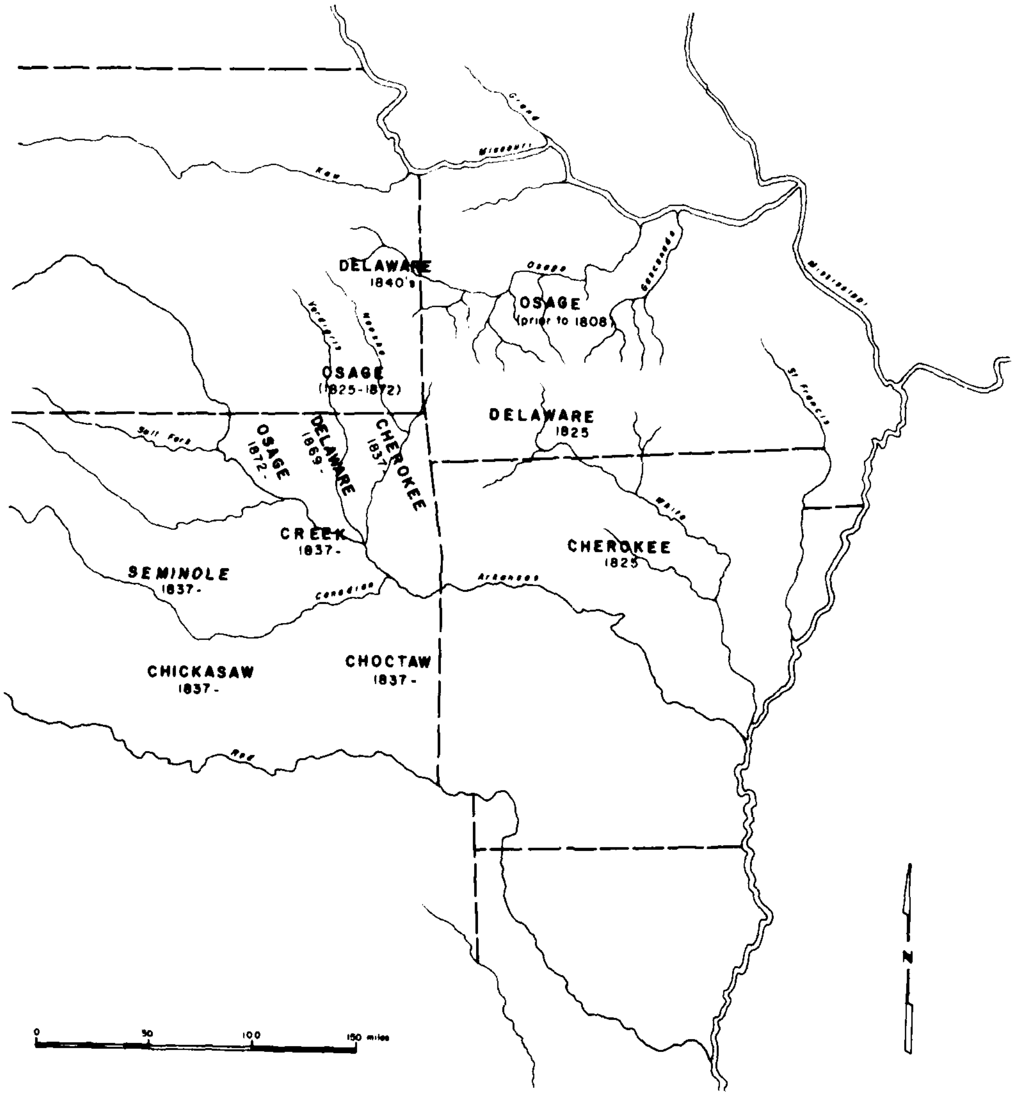


FIGURE 7: Historic positions of eastern tribes and the Osage during the 19th Century.

culture-historic sequence for the Little Caney Valley, then, in addition to refining it and providing limited information as to the changing environmental conditions which may correlate with cultural periods. Refinement of the valley geology has aided in these aims, and constituted a major part of the work. Finally, it is apparent that the historic and protohistoric use of the valley may be significant to questions concerning the relations between known Native American groups and Europeans, especially the French.

Site Reports

The four archaeological sites investigated during the 1978 field season are located in quite different physiographic circumstances. Site 34WN30 is located on the streambank of Cotton Creek, while 34WN32 is located under the rock overhang west of Cotton Creek, about ½-mile downstream from 34WN30. Across the Little Caney Valley on the north is 34WN68, a large open site on the colluvial margin of the floodplain. Its prehistoric components are buried by valley margin wasting and periodic flooding, although in general the site lies above the recent flood level. Finally, to the south on the west side of the river, above the valley on the edge of the cuesta ridge, is the single rockmound designated 34WN64 (Figure 1). The sites are reported here according to the quality and quantity of information yielded. Site 34WN32 yielded the largest quantity of information and presented the broadest display of potential components. It is followed by the discussion of 34WN68 which, although only tested, yielded a large quantity of information on early human activities in the Copan Lake area. Site 34WN64 produced few tools, but yielded data concerning the potential activities carried out at small rockmound in the region, as well as information which will aid in approaching larger rock aggregations in Copan Lake area sites. Finally, Site 34WN30 produced limited but valuable data for expanding our picture of the development of the Little Caney Valley.

34WN32 Excavations

Site 34WN32 is a rockshelter situated along a resistant sandstone escarpment on the westside of the north fork of Cotton Creek about 7km upstream from the confluence of the creek and the Little Caney River. The shelter faces generally toward the south (SSE) and has an approximate overhang of 2m extending about 20m along the escarpment (Figure 8). Deposits in the shelter are thin to the east, but somewhat thicker on the west end of the sheltered area. The sandstone block forming the overhang has broken away from its parent unit on the ridgecrest, and an alluvial slope is present along the west margin of the site. Deposition in this small

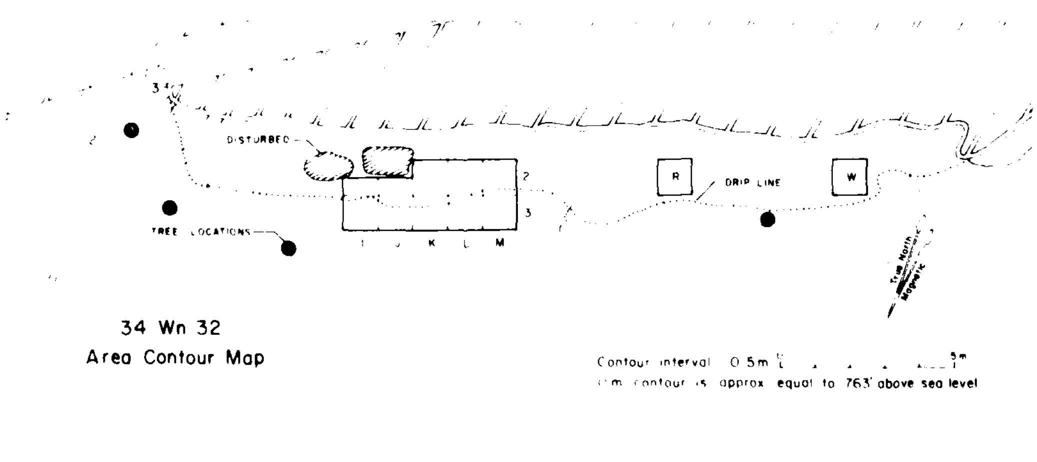


FIGURE 8. Excavations at 34WN32 showing position of rear wall of shelter, limits of overhang, and contours of deposits.

alluvial fan has contributed to the site deposits.

The rockshelter covers a ledge about 4m wide from the back of the escarpment to the talus slope, interrupted by a subtle depression midway along the covered area. Thus, there are two essentially level zones of the shelter. A disturbed area on the west end of the shelter was also present (noted by Rohn and Smith, 1972). This area had created minor damage to the main deposits of the site.

The main excavation of 34WN32 was located on the west end of the shelter in a position under the overhang, but also extending out toward the edge of the talus slope. This excavation unit consisted of a trench 2m wide and 5m long, removed in 1m square units subdivided into quadrants; it was expanded because it showed the greatest depth of cultural deposits. All levels removed from the site were taken in 10cm increments measured from an arbitrary 0 cm datum plane. Variation of the surface below the arbitrary datum level was no greater than 5cm in any of the excavation units. The overall volume of matrix excavated in the 0-10cm level is slightly less, nonetheless, than the volume of subsequently excavated 10cm levels. This difference is reflected in the density data presented in Table 1. The one-meter squares of the main excavation unit and elsewhere in 34WN32 were designated by the letters R and W (see Figure 8). The units of the main excavation are further differentiated as being in row 2 or 3 (counting away from the back wall of the shelter). Depth of excavation was determined by the quantity of roof-fall encountered, except where bedrock was encountered in squares R and W.

The individual quadrants of each level of each square were removed separately and all matrix was returned to the Laboratory of Archaelogy to be wet-screened through 1 mm mesh metal cloth. Tools and features were noted on level reports and in general notes on the excavation. Tools were rebagged with matrix in the field and transported to the laboratory for processing. Processing of wet-screened materials included picking and separation of lithic, charcoal, bone, and other classes of debris. This picking was accomplished by hand. Tools and fragments of tools inclusive of materials ranging toward 1mm in maximum dimension were segregated from the debris during the picking process. No well defined features requiring separate material handling were noted at 34WN32. Therefore, the entire material sample is reported in terms of the arbitrary 1m grid in 10cm levels. The quadrant system allows refinements in provenience reporting for distributional analyses, and some material classes from 34WN32 are reported in terms of horizontal distributions by quadrant.

Stratigraphy

Two major stratigraphic units were noted during the excavation of the rock shelter: (a) an upper unit consisted of a black sandy clay extending to a depth of from 30cm to 40cm, and (b) a lower unit consisted of a grey to yellow compacted clay, occurring in a gradual color transition from the base of the upper unit to depths where rooffall or bedrock covered the excavation floor (see Figure 9). The upper unit includes considerable charcoal, sometimes as well defined lenses, evidently produced in one of several possible prehistoric hearths. Three hearths, one located near the center of the main excavation unit, one located on its west end, and the third located in the entire southeast corner between 20-30cm depth, consisted of concentrations of charcoal and cobbles of sandstone which had apparently been fired. Neither of these features was well-defined in cleanings of level-floors, although a shallow excavation in the tan lower clay unit was noted in the adjacent quadrants of squares K2, K3, L2 and L3, at a depth of from 30cm to over 40cm. Rock associated with those squares had evidently been removed and scattered around the periphery of a shallow hearth depression originating somewhere in the 10-20cm level.

The base of the main excavation unit was generally thick roof-fall rather than bedrock. It is unknown if very deeply buried deposits lie under this roof-fall; however, debris densities suggest that the primary occupancy of the site is relatively late in time while the earliest use of the shelter was quite sporadic. Earliest occupancy is evidently associated with the lower stratigraphic unit. More intensive later activity, then, in part accounts for the accretion and chemical alteration which created the identifiable upper soil-stratigraphic unit. Technically, the upper zone should be considered a midden rather than a soil. Internal differentiation of the upper stratigraphic unit is difficult, but it is apparent that there is considerable potential for disturbance of primary deposits. Stratigraphic and distributional analyses within this unit were undertaken to attempt the

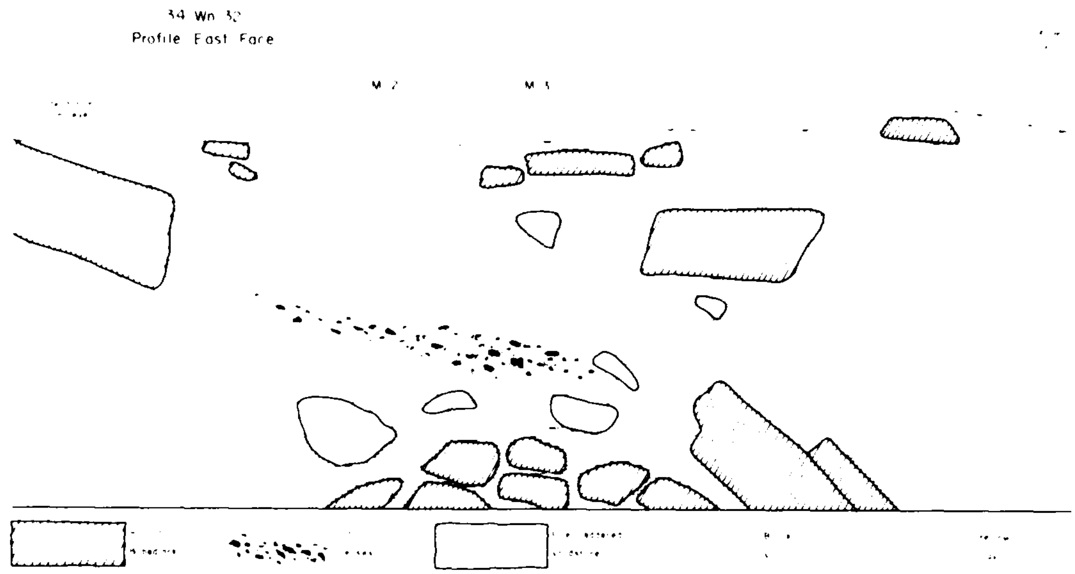


FIGURE 9. Stratigraphic profile of 34WN32, east end of main excavation.

isolation of vertically differentiated components, and horizontally or vertically differentiated concentrations of tools indicative of particular work activitie.

Recovered Artifacts

Artifacts from 34WN32 included chipped-stone materials, pottery, bone and bone tools, snails and other shells, shell beads, trade beads, and a few metal implements. In the lowest parts of the excavation the tools inventory is composed entirely of chipped-stone materials, pottery, and fragmentary faunal remains. The metal and historic items are concentrated at the uppermost parts of the deposits, almost exclusively in the 0-10cm level. Throughout the deposits chipped-stone tools and debris dominate the assemblage. These materials are completely described in this report, along with tools in all other material classes. Bone debris was brought under limited analysis, but is extremely fragmentary and so not strongly representative of the quality of large mammal remains. These faunal remains contributed to our understanding of changes in depositional contexts, and the intensity and kinds of human activity in the shelter.

Chipped-Stone Assemblage

A total of 18,682 chipped-stone artifacts were recovered from 34WN32, of which only 226 were tools, tool fragments, or partially finished elements of tool production routines. The non-tool elements were classified according to morphological characteristics representing stages of manufacture in a lithic reduction sequence. The classes recognized are as follows:

Cores include pieces of raw material from which one or more flakes have been struck.

Primary elements consist of flakes which display cortex over their entire obverse surfaces.

Secondary elements are flakes which exhibit both cortex and flake scars on their obverse surfaces.

Tertiary elements are flakes with totally flaked obverse surfaces.

Bifacial thinning elements represent spalls which display lipped bulbs of percussion, acute angles at the intersections of their platforms and dorsal surfaces and multifacetted platforms.

Chunks are blocky spalls which do not clearly

TABLE 1

Non-tool Element Densities, Counts, and Frequencies from 34WN32. Non-tool density is based upon number of elements per 0.1 cubic meter of excavated fill.

Level	Quads	Non tool Density	Primary		Secondary		Tertiary		Bifacial Thinning		Core		Chunk		Total
			N	%	N	%	N	%	N	%	N	%	N	%	
0-10	42	601.5			66	1.0	5944	94.1	291	4.7			15	.2	6316
10-20	44	654.0	2	1	219	3.7	6747	94.7	180	2.5	1	.1	50	.7	7199
20-30	42	224.3	5	2	125	5.3	2131	90.5	83	3.5			11	.5	2355
30-40	31	189.0			66	4.5	1269	86.6	125	8.5			6	.4	1466
40-50	26	86.8	1	2	19	3.4	522	92.5	21	3.7			1	.2	564
50-60	18	96.0			2	.5	415	96.0	13	3.0	1	.2	1	.3	432
60-70	6	64.7					94	96.9	2	2.1			1	1.0	97
70-80	4	27.0			1	3.7	26	96.3							27

exhibit flake characteristics, especially a striking platform or bulb of percussion.

The densities of non-tool chipped stone artifacts are the clearest indicators of intensity of occupancy from 34WN32. The density data are presented by debris class in Table 1. The greatest density of non-tool elements occurs in the upper 20cm of the dark clay deposit. Below the 20cm level there is a radical density shift—a reduction by nearly two-thirds of the concentrations observed in the upper parts of the deposits. There is also a gradual decrease in density of non-tool elements below the 20-30cm level. These data suggest that there may be an internal division of the upper soil-stratigraphic unit which represents either a change in the rate of accumulation of deposits or a change in the intensity of human activities in the shelter.

The shift in density of non-tool elements is accompanied by a difference in the relative proportions of secondary, tertiary, and bifacial thinning elements. Tertiary elements occur in higher proportions in the upper two arbitrary levels than they do between 20 and 40cm. There is a very high proportion of thinning elements in the 30-40cm level, as well as a generally higher proportion of secondary elements between 20 and 40cm. The almost complete lack of primary elements and core materials suggests that the site was not used as a locality for the complete reduction sequence, but the occurrences of some substantial numbers of secondary elements indicates that at times core or preform materials were worked in the shelter. The strong predominance of tertiary and bifacial thinning elements indicates that considerable finishing and resharpening of tools was accomplished at the site. The proportions of the various non-tool elements in the deepest levels excavated (below 50cm in depth) indicate that knapping activities were limited to finishing and resharpening.

There is considerable horizontal variation in the occurrence of all classes of non-tool lithic debris. This variation, coupled with the differential occurrence of roof-fall, has made sampling for the purposes of more detailed analyses a difficult task. Nonetheless, a 25% sample was taken for the purposes of generating metrical data on non-tool elements and assessing raw material varieties. This sample consisted of 11 quads each for the first three arbitrary levels, 8 quads from the 30-40cm level, 6 quads from the 40-50cm level, 5 quads from the 50-60cm level, 1 quad from the 60-70cm level, and 1 quad from the 70-80cm level. The sample quads were assigned level by level using a table of random numbers.

Dimensional data for the unbroken tools and non-tool elements from the rockshelter are presented in Table 2. All of the tools recovered in the excavation are included in the table, but the non-tool dimensions are based upon the sample collection. The mean length and width measurements for each class of measured element and each arbitrary level are presented in graphic form in Figure 10. The plots of

TABLE 2

Dimensional Data on Unbroken Tools and Non-tool Elements from 34WN32.

		Length/mm		Width/mm		Thickness/mm	
	N	X	S.D.	X	S.D.	X	S.D.
Level 0-10							
Tools	37	17.6	6.3	13.6	5.4	2.79	1.26
Secondary	4	5.8	2.1	5.2	1.5	.18	.01
Tertiary	200	6.0	2.7	4.6	2.4	.12	.08
Bifacial Thinning	64	6.8	3.4	5.2	2.9	.12	.05
Level 10-20							
Tools	38	17.4	10.2	13.4	5.6	2.87	1.62
Secondary	8	8.9	1.4	8.8	3.1	.20	.10
Tertiary	252	5.8	3.2	4.9	2.6	.08	.05
Bifacial Thinning	15	6.7	2.0	5.0	1.6	.07	.02
Level 20-30							
Tools	29	16.0	5.7	12.9	4.3	3.00	1.48
Secondary	12	13.6	7.3	9.6	3.7	.27	.16
Tertiary	100	6.4	2.9	5.9	3.0	.11	.05
Bifacial Thinning	24	7.6	3.9	6.2	3.9	.11	.05
Level 30-40							
Tools	12	16.3	4.2	12.6	3.9	3.31	1.02
Secondary	5	9.6	2.5	9.6	4.0	.17	.06
Tertiary	41	7.0	4.8	5.8	3.4	.10	.05
Bifacial Thinning	17	6.8	4.3	5.8	3.5	.09	.04
Level 40-50							
Tools	4	14.0	1.4	16.0	3.7	3.78	1.79
Secondary	2	12.5	3.5	11.0	5.6	.24	.02
Tertiary	32	6.1	2.6	5.6	3.3	.10	.06
Bifacial Thinning	3	5.0	1.7	5.3	1.5	.08	.02
Level 50-60							
Tools	4	17.3	7.1	16.5	7.8	6.88	1.21
Tertiary	24	5.6	2.9	5.4	3.0	.08	.04
Bifacial Thinning	3	11.0	5.2	6.0	2.6	.09	.05
Level 60-70							
Tools	1	24.0	0.0	15.0	0.0	6.10	0.00
Tertiary	4	4.0	.8	3.0	.8	.06	.01
Bifacial Thinning	2	8.5	2.1	7.0	4.2	.10	.05
Level 70-80							
Tertiary	1	3.0	0.0	3.0	0.0	.05	0.00

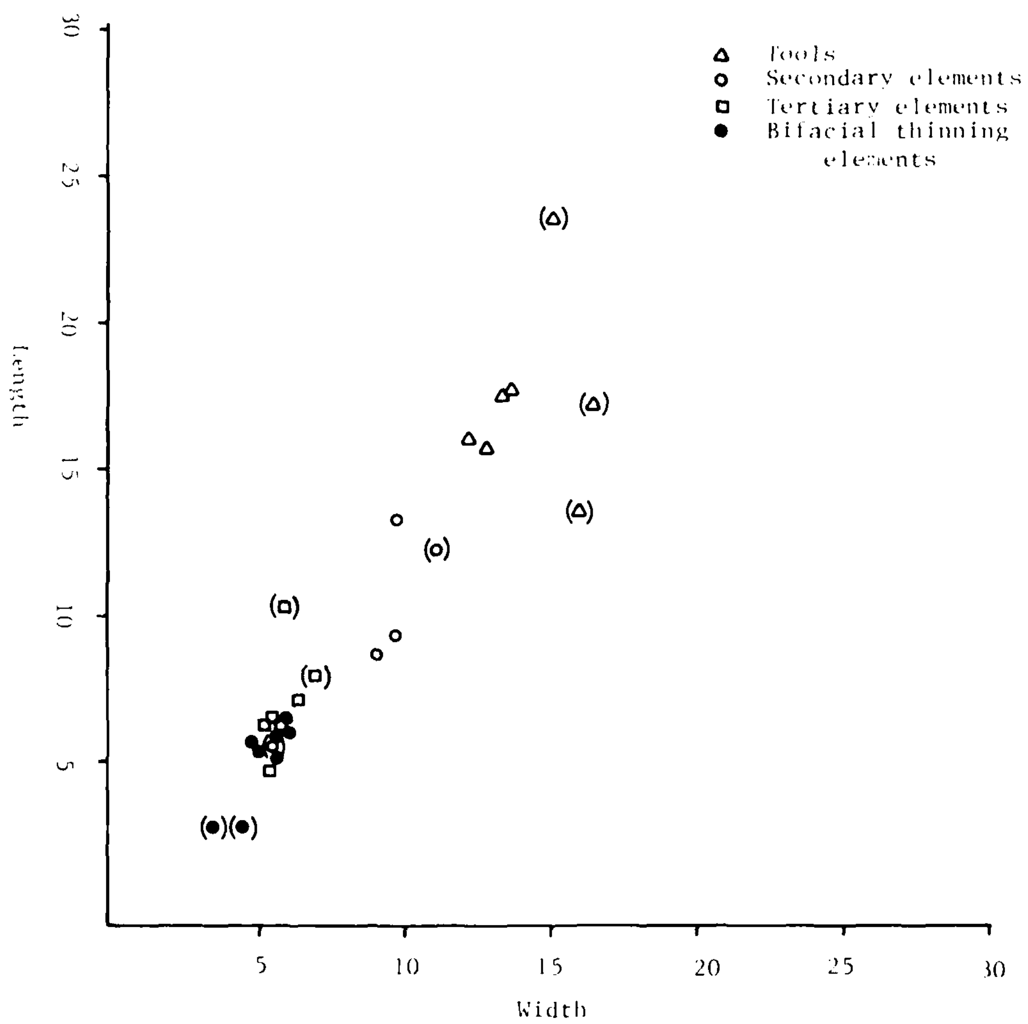


FIGURE 10: Mean length and width dimensions of tool and non-tool elements from 34WN32 by arbitrary levels (levels with fewer than 5 elements shown in parentheses).

bifacial thinning element and tertiary element dimensions show remarkable consistency, except for those levels deep in the site which yielded very small numbers of elements. The scatter of plots for secondary elements reflects the small numbers of these spalls throughout the excavation, although the general dimensions of the secondary elements are as expected within the proposed lithic reduction sequence. Tool dimensions, except in levels with small numbers of tools, also show a remarkable consistency of mean values. This suggests that raw materials may have been brought to the site in the form of preforms or finished tools within a restricted series of forms

The dimensional data for tools and non-tool elements do not clearly segregate the upper and lower portions of the site deposits, especially within the dark clay upper unit. This indicates that the

general quality of reduction characteristics is similar for the duration of the site occupancy, in spite of the indications of qualitative differences within the deposits based upon other criteria of comparison. That is to say, those activities carried on at the site having to do with production and maintenance of a tool kit involved essentially the same ranges of reduction tasks with essentially similar starting materials.

Chipped-stone Tool Description

The 226 Chipped-stone tools from 34WN32 are distributed among 13 classes of material. Subdivision within some of the classes were made based upon formal attributes. The most complex attribute systems involved small projectile points and retouched pieces. These attribute systems are presented schematically to allow the reader to assess patterns of attribute association which are not stressed in this discussion. The attributes for the small projectile points include technologic distinctions related to the production sequence and stylistic variation. In general, however, the classification of tools presented here is aimed at identifying materials with work-tasks through the study of formal patterning and task-associated modification.

Scrapers. Ten scrapers were recovered, six of which are counted simply as scraper fragments. The fragments are all of Kay County chert. The typed specimens include a simple endscraper (Figure 11, a) of an unidentified gray chert, a triangular endscraper (Figure 11, b) of Kay County chert, and two broken pieces of simple sidescrapers (Figure 11, c and d) also of Kay County material. One of the sidescrapers, the triangular endscraper, and five of the fragments show the pink Kay County chert alteration indicative of heat-treatment.

Points. Large and small points were recovered from 34WN32. The large points are produced from small biface blanks or large flakes, and are of a size usually considered indicative of use as "darts" or points of throwing or thrusting implements. Small points are produced from smaller flake blanks, and have been further differentiated into "thick" and "thin" blank groups. The thick-blank group shows a strongly asymetrical longitudinal section, while the thin-blank group shows symmetrical longitudinal sections or concavo-convex sections (see Figure 12). In general, retouch on thick blank points is rather steeply executed, while the thin-blank points show at least one surface to be covered with thinning flake scars. Neither group is consistently thinned on both flake surfaces, although bifacially thinned, symetrical points do occur regularly in the thin-blank group. The small points are of a size usually considered indicative of use as "arrow" points.

Only five specimens from 34WN32 represent large points and identifiable broken pieces of such points. They exhibit quite different shape attributes, although the basal configurations of two of the specimens are similar. These two points have concave bases on short stems produced by corner notching (Figure 11, e) and shallow side notching (Figure 11, f). The corner-notched specimen is made of Keokuk chert, while the side-notched piece is of Yellow Kay County chert. The bases of broadly side-removed points, (Figure 11, g and h) and the basal section of a concave-based expanding stemmed point (Figure 11, i) were also found. The expanding-stemmed piece is of Keokuk chert and has longitudinal flaking which produces the basal concavity. The side-removed bases differ in basal configuration and material. One has a straight base and is made from Kay County chert, while the other has a convex base and is made from an unidentified brown banded chert, possibly one of the variations of Keokuk material. Finally, a tang element of a large point made from an unidentified pinkish-white material with a waxy luster was found.

The small point attribute system reflects distinction relating to flake blank selection, shape, manufacturing process, and breakage. These attributes are organized according to manufacturing processes in Figure 12. Thick blank points are represented by corner-removed and side-removed forms, with or without the production of a denticulate edge (Figure 11, j-m). Stem fragments from these points were also recovered. There were also a few triangular points produced on thick flake blanks (Figure 11, n). The subtle differences in the small point materials are reinforced by stratigraphic associations and the proportions of diverse raw lithic materials represented in the thick-blank and thin-blank groups. Lithic associations for all small points are shown in Table 3. The thick-blank and thin-blank materials clearly segregate for raw material attributes. It is interesting that small triangular point bases (lots B

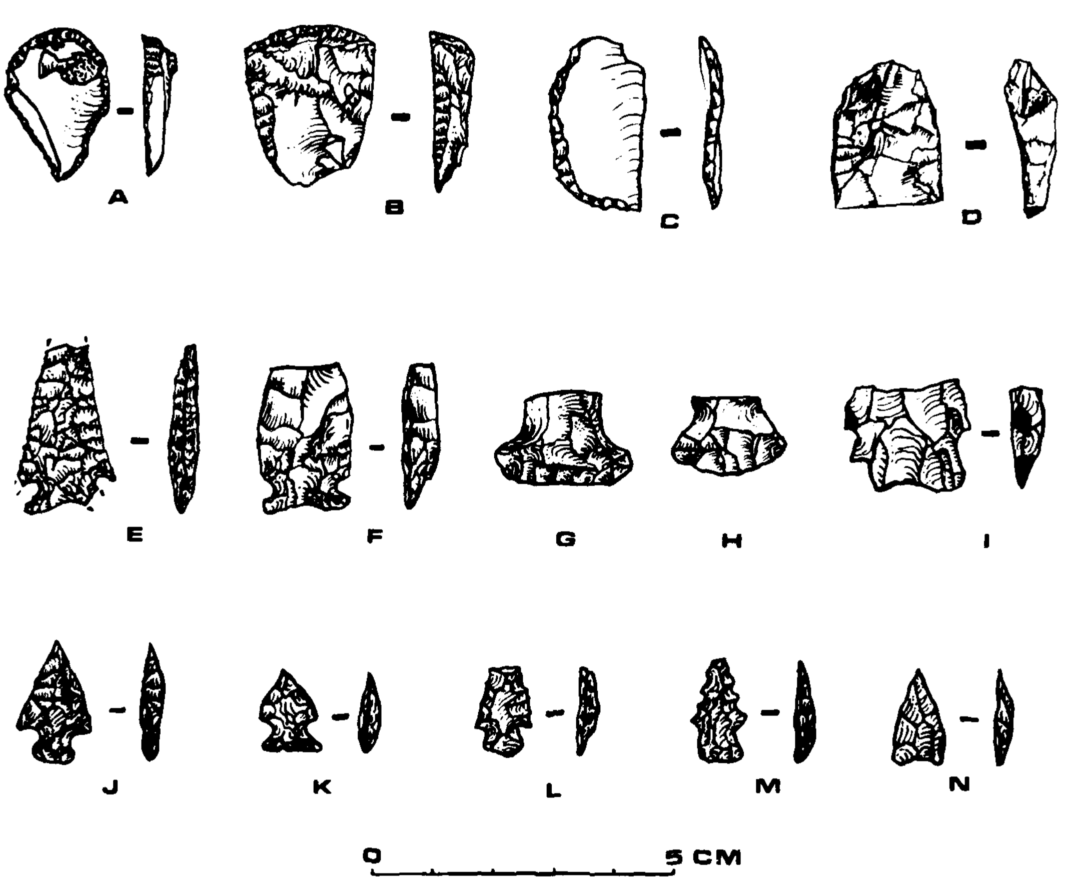


FIGURE 11: Chipped-stone tools from 34WN32.

and C) pattern similarly to the thick-blank series, while they seem strongly differentiated from most of the thin-blank notched forms. Indeed, the frequency of Kay County chert within the thin-blank series seems to be a sensitive indicator of form.

Thin-blank points are much more well represented in the 34WN32 collection. Several specimens appear to represent the initial stages of production of these points (Figure 13, a-c). There are very few complete points in the collection, but a series of related forms are defined through the attribute study. The most prominent of the complete or near-complete points are simple side-notched forms which are not highly consistent as a group (Figure 13, d-h). These notched points (lot E) share lithic associations with the points exhibiting supplemental notching (lots G and H; Figure 13, j-o). However, basal and blade fragments of simple side-notched points (lot F) show a high frequency of the use of Keokuk chert. These whole notched points and notched point fragments, then, both form anomolous patterns when viewed from the combined perspectives of form attributes and raw material associations. The notched specimens do not all properly fit with the production sequence because they are formally variable, while the notched fragments do not fit on the grounds of differences in raw material frequencies.

Thus, the basic flow of the production sequence in Figure 12 is supported by lithic-type identifications for the thick-blank and thin-blank groups, with two

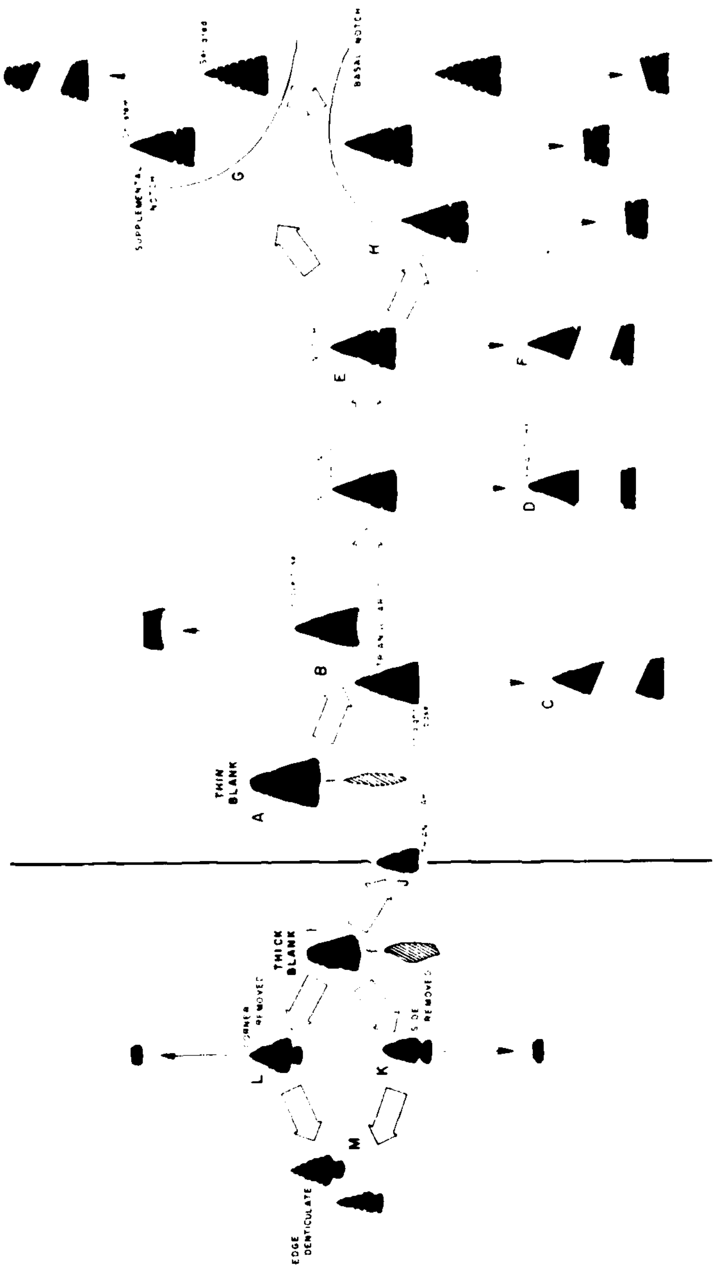


FIGURE 12: Production sequence and stylistic variation of small points from 34WN32.

TABLE 3

Raw lithic materials associated with small point elements from 34WN32. (Letters in parentheses are lot references).

	Kay County	Keokuk	Other	Total
Thick Blank Point Elements				
Tips		2		2
Stems	1	2		3
Corner Removed				
Straight (L)		2		2
Denticulate (M)		1		1
Side Removed				
Straight (K)	1		2	3
Denticulate (M)		1		1
Triangular (J)	1	3		4
Unclassed	1		1	2
Totals	4	11	3	18
Thin-Blank Point Elements				
Unclassed	1	1		2
Blanks (A)	7	2		9
Supplemental Notches (G)	5	2		7
Basal Notches (H)	4	3		7
Notch Fractures (D)	4	1		5
Notched (E)	4	1	1	6
Broken Notched (F)	4	9	1	14
Straight Base Triangular (C)	1	6	3	10
Concave Base Triangular (B)	1	1	2	4
Tips	18	10	5	33
Totals	49	36	12	97

major exceptions. First, there appear to be few unnotched points of the kind which might be expected to result from the actual blanks (lot A) recovered at the site. The unnotched points (Figure 13, p-q) appear to be part of a production routine dissassociated from the blanks and notched points especially those notched points with supplemental notching. The blanks, moreover, relate specifically to the notch fractures (lot D; Figure 13, r-s), supplemental notched (lots G and H), and at least some of the notched fragments (lot F). Second, at least part of the material noted as notched fragments represents pieces of probable thick-blank forms.

These data suggest, then, that there are three groups of small points at 34WN32: (a) thick-blank materials, (b) unnotched materials of both thin-blank and thick-blank association, and (c) a series of notched points which represent the major on-site production sequence for points. Points of the first two groups were probably brought to the site as finished specimens and lost, or in the event of broken specimens, replaced as part of the routine activity in the shelter. At least some of the points of the third group were produced on the site, as attested by the presence of blanks, but the broken majority were probably deposited in dehafting activities.

Retouched Pieces. A total of 62 retouched pieces were recovered from 34WN32, most of which are from the upper levels of the deposits. These pieces were differentiated according to attributes identify-

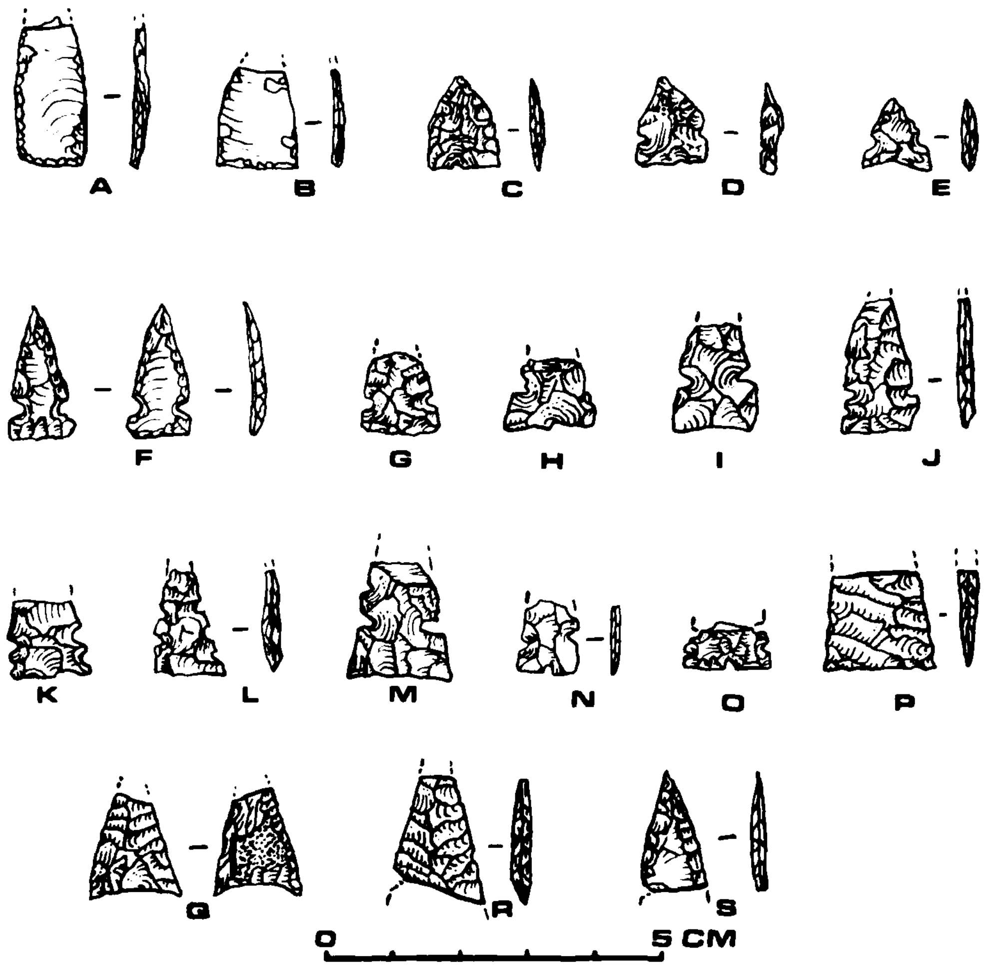


FIGURE 13: Thin-blank points from 34WN32.

ing the location and form of retouch. All of the retouched pieces displayed continuous flake scars along at least one edge. The attributes used in describing the materials are as follows:

(a) Modification of flakes is through either *abrupt, fine, or normal* retouch. Abrupt retouch is steeply executed so that it modifies the flake surface to only a limited extent. Normal retouch directly modifies the flake surface as well s the edge and may involve overlapping flake scars. Fine retouch involves flake edge modification which is along thin edges, but which does not alter the surfaces adjacent to the utilized edge.

(b) Modification may be either inverse (bulbar), obverse, marginally bifacial, or alternate. Alternate flaking shifts from the inverse to observe sides of the flake at some point along the edge.

(c) Modification of a flake may be either bilateral or unilateral. Unilateral pieces may have retouch on a long arc or obtuse angular section of a flake. Bilateral pieces have retouch along parallel edges or two edges forming an acute angle.

The retouched pieces from 34WN32 (see TAble 4) represent almost all possible combinations of these attributes. There are two combinations of attributes which appear in high frequency, and which seem to represent somewhat different kinds of tools. Flakes with fine unilateral retouch are the most prominent, occurring in almost equal numbers on inverse and obverse sides of flakes. These tools generally indicate simple utilization of flakes. Marginally bifacial flakes with normal retouch represent the other high frequency item. These represent small tool fragments in various stages of manufacture.

Three of the retouched pieces (Figure 14, a-c) represent items of a thickness and length which suggest they could be blanks within the thick-blank point sequence of production. None of these materials seem contextually or materially correct for such an assignment, however. Two of the pieces are abruptly flaked, bifacial-marginal tools which could easily represent early stages in the production of points, but they are from the uppermost levels of the deposits—quite apart from the bulk of thick-blank material. The third piece shows obverse normal retouch on the whole surface of a flake of Kay

TABLE 4

Retouched Pieces from 34WN32.

		CONTINUOUS			
		Inverse	Obverse	M. Bifacial	Alternate
ABRUPT	Unilateral	2	3	1	-
	Bilateral	1	1	3	2
FINE	Unilateral	11	9	4	1
	Bilateral	1	5	1	-
NORMAL	Unilateral	1	1	2	-
	Bilateral	2	1	10	

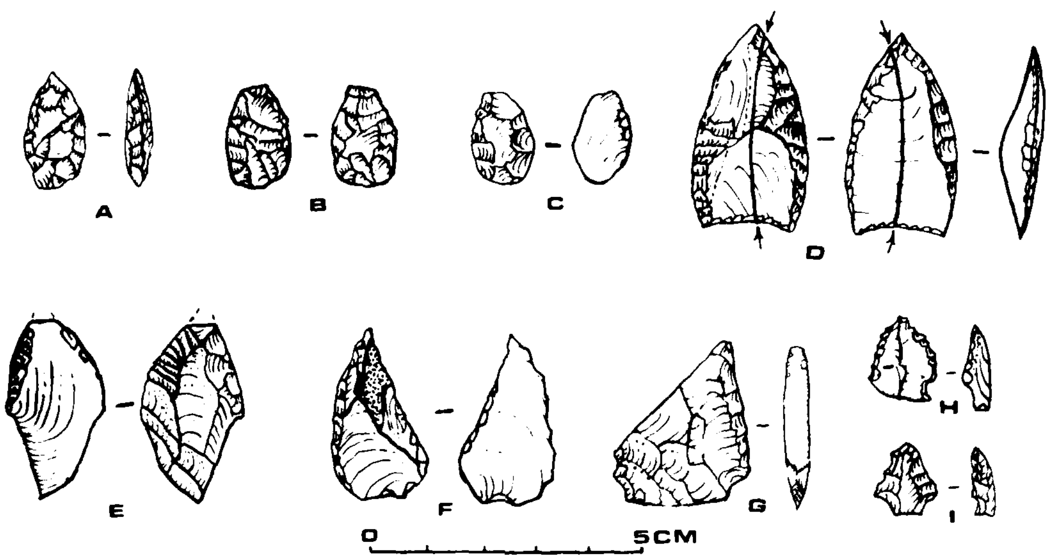


FIGURE 14. Chipped stone tools from 34WN32. Retouched pieces possibly representing blanks within the thick-blank sequence, a-c; perforators, d-f; biface, g; small stemmed tools, h-i.

County material. Although the thickness and length of this piece are appropriate to the thick-blank point series, the raw material and flaking patterns suggest that the tool is not related to the thick-blank points. Considerable effort was made to isolate blanks for the point groups, and only these three items are at all suggestive of actual thick-blanks.

Perforators. Five specimens show bilateral retouch affecting opposite sides of a flake or shaped piece. These pieces are classed as perforators. Two of the fragments form part of the same tool (Figure 14, d), which is made from Kay County chert. The other specimens are of a brown unidentified chert probably derived from stream pebble deposits (Figure 14, e), and Keokuk chert.

Biface. One well-formed bifacially-flaked tool was found at 34WN32, (figure 14, g). This piece is thinned on both surfaces and has a small concave section removed at the intersection of two edges. The flake-blank is interrupted by a long transverse break, probably accidental fracture of a large point. The pointed end of the tool shows evidence of use. Several small flake scars have affected the break surface along the edges near the tip of the piece.

Small Stemmed Tools. Two small broken stemmed tools were recovered. One (Figure 14, h), is made of Kay County chert and has abrupt, bilateral retouch on its obverse surface. One end of the tool appears to have been partially thinned in an attempt to produce a stem. The abrupt retouch on the piece has produced a denticulate edge. The second tool, produced of Keokuk chert, shows obverse abrupt flaking denticulate edges, and clear stem preparation (Figure 14, i). The stem of this piece is broken well below the shoulder-tang area.

Notches. Three tools show concave surfaces with steep retouch along at least one edge. Two of these tools are made from Kay County chert, while the third is made from an unidentified mottled pink-creme colored material. This latter material is very similar in appearance to Kay County chert, but lacks banding, fossils, or other characteristics with which identification might be made. Further, the material seems to have been obtained in nodule or stream-pebble form, since the specimen (Figure 15, a) exhibits a cortical striking platform and cortex on its obverse surface. One of the other notches has ral worked edges (Figure 15, b), and is a somewhat heavier, more blocky tool than the others. This latter specimen in particular is well suited to a variety of

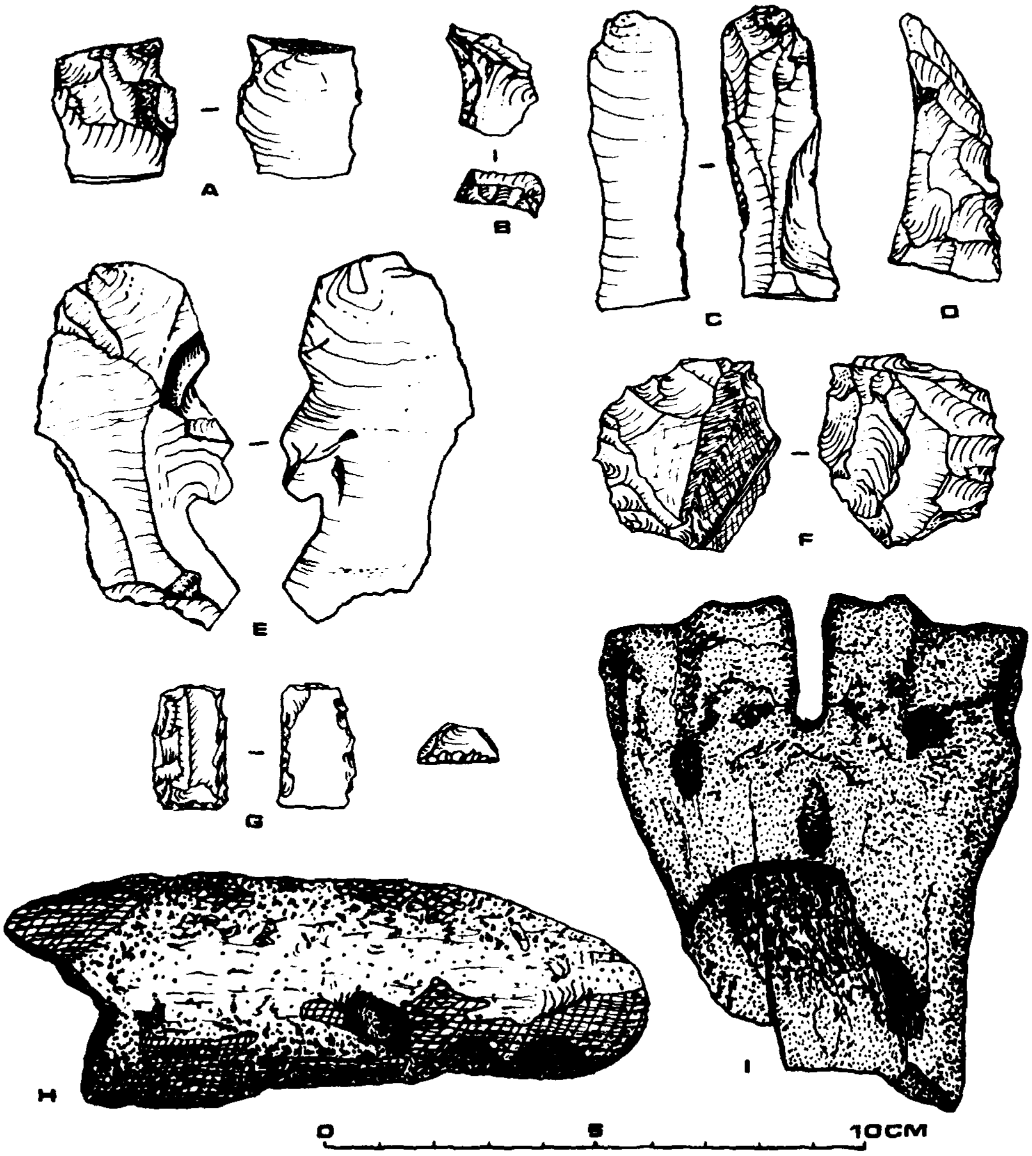


FIGURE 15: *Chipped stone and bone artifacts from 34WN32.* Notch, a and b; retouched prismatic flake, c; abrupt denticulate retouched piece, d; flake knife, e; core, f; gunflint, g; bone flesher, h; bison metapodial fragment, i.

woodworking tasks.

Varia. most of the eighteen tools classed as varia are extremely small fragments of retouched material. Two items in the varia count deserve special note, however. *One* (Figure 15, c) is a linear flake evidently struck from a well-prepared core. This flake is of Kay County material, and shows short lengths of fine retouch bilaterally on the obverse side of the flake. Since the item is rather different in character from the majority of retouched pieces, it is included in this separate description. Similarly, another specimen which might have been included in the retouched pieces (Figure 15, d) is rather distinctive in its size and retouch characteristics. This piece is a large blocky spall of Kay County chert with retouch along two segments of edges on its obverse side. The retouch on this item is abrupt, creating a heavy denticulate appearance on both edges.

Drill tips. Two long pointed tips of small perforators were found in the shelter. One of these is made from Keokuk chert, while the other is made from Kay County chert.

Knife. A broad linear flake of Kay County chert shows extensive, very fine, bifacial edge damage. The edge of this piece is very thin, and most of the fine flake scars appear to be the results of utilization rather than intentional edge modification. Accordingly, the piece is classed as a flake knife (figure 15, e).

Core. A small piece of Kay County chert which exhibits the pink color indicative of heat treatment is the only core recovered from 34WN32. The specimen (Figure 15, f) has two well defined platforms from which several relatively small flakes were struck. Additionally, flakes were removed bifacially along one edge of the piece.

Gunflint. Prismatic gunflint of honey-colored "French" material was recovered in the excavation (Figure 15, g). The gunflint is of the prismatic variety introduced into the region in the early eighteenth century by traders.

Raw Material Sources

Raw material analysis distinguished a total of six broad classes of lithic material (Table 5). Of these, two of the classes account for over 90% of the collection during most of the occupancy of the site. These classes are: (a) Kay County chert and related cherts located to the west of the Copan Lake area, and (b) Keokuk chert, a broadly variable aggregation of materials coming from geologic formations located to the east of the Copan Lake area. In materials larger than 4mm the discriminating characteristics for Kay County chert are banding, mottling, presence of *Fusulina* and yellow color, or more often pink color brought about by heat treating. Of spalls of Keokuk chert larger than 4mm gray, mottled gray, and blue gray specimens predominate over those with a primary color field of white. In materials under 4mm, color was used as the main discriminating attribute in identifying these cherts, supplemented with other attributes observable in a very small number of the specimens viewed. Pink or yellow spalls were assigned to the Kay County group while gray, gray-brown, white, and blue-gray spalls were assigned to the Keokuk group. There was potential for confusion of the gray-brown Keokuk materials with the yellow Kay County materials in these small size ranges. The effects of such confusion to this particular analysis are minimal, however, since few spalls of either gray-brown Keokuk material or yellow Kay County material were identified. Indeed, over 99% of the non-tool materials associated with the Kay County group of cherts exhibit the pink coloration. Similarly, there were only a few spalls of Keokuk chert not showing gray and blue-gray color phases.

Comparison of raw material varieties for 34WN32, again based upon the total stone tool collection and the sample of non-tool elements, shows a difference between upper and lower levels of the dark clay unit (Table 5). For levels below 20cm represented by over 100 pieces of debitage, a clear and consistent relative proportion of Kay County to Keokuk chert occurs. Above 20cm these proportions are disrupted by an increase in Kay County material. There is no consistent representation of Kay County chert in the upper two levels. The variations in the figures derived from the sample result from horizontal distributions of non-tool elements in the sample units rather than from vertical changes in the proportions of material.

The vertical distribution of chert types represented in the tool collection shows a parallel trend in chert utilization in the upper three arbitrary levels. Kay County chert utilization occurs in the highest proportions in the upper two levels, considerably higher in the 0-10cm level, while Kay County and Keokuk cherts are equally represented in the 20-

TABLE 5

Raw Material Varieties from 34WN32.

		Kay County		Shidler		Keokuk		Unidentified White		Gravel		Unidentified	
	N	N	%	N	%	N	%	N	%	N	%	N	%
Level 0-10													
Tools	69	35	(50.7)	-		23	(33.3)					11	(16.0)
Non-tools	1881	839	44.5	4	.2	1030	54.7	1	.05	3	.2	4	.2
Level 10-20													
Tools	76	36	(47.4)			34	(44.7)		–	–	–	6	(7.9)
Non-tools	2354	1204	51.1	1	.04	1135	48.2	9	.4	5	.2		–
Level 20-30													
Tools	54	25	(46.3)	1	(1.9)	25	(46.3)				–	3	(5.6)
Non-tools	681	278	40.8	3	.4	392	57.6	6	.9	2	.3	–	
Level 30-40													
Tools	18	10				7			-	-		1	.06
Non-tools	340	137	40.3			201	59.1	2	.6	-	-	–	–
Level 40-50													
Tools	4	3					–		-	–	–	1	–
Non-tools	166	68	41.0			98	59.0		–	–	–	–	–
Level 50-60													
Tools	3	2				1	–	–		–	–	–	–
Non-tools	149	63	42.3			82	55.0	4	2.7	–	–	–	–
Level 60-70													
Tools	1	1					–	–	–	–	–	–	–
Non-tools	37	12	32.4			25	67.6	-	–	–	–	–	-
Level 70-80													
Tools								–	–	–	–	–	-
Non-tools	6	3	50.0			3	50.0	-	–	–	–	-	-

30cm level. Below 30cm there are too few tools to allow reliable inferences based upon the proportions of representations. Note that the proportions of tools in the 30-40cm level for the two main chert types are approximately opposite the proportions of non-tool representation (the 10 Kay County specimens equal approximately 60% of the tools recovered from the level).

Ceramic Artifacts

A total of 13 sherds and one clay pipe fragment were recovered from 34WN32. All but one of the sherds show exterior cord marks. The sherds exhibit four temper variations. One sherd has visible clay inclusions with diameters of up to 1 mm and parallel cord impressions which are deeply set and appear not to have been smoothed over. Four other sherds were tempered with a clay-grit combination with particles again ranging from very fine particles to grit as much as 1 mm in diameter. These sherds have been heavily leached, leaving mainly clay inclusons as the visible temper constitutent. The holes left by the leaching are angular and blocky, suggesting the tempering material to be crushed limestone. Cord impressions on these four sherds are cross-set, but create no well defined pattern. The corded texture of the surface is further modified on these sherds by smoothing.

Five other sherds exhibit little visible tempering

material, although one of the six has blocky leached pockets 5mm and less on its surfaces. This sherd fits with one of the other sherds of this group which is not leached, a but which also displays no visible temper. One of the other sherds in the group shows a few very fine-grained grit inclusions. All of these sherds are extremely hard — interior hardness is in excess of 6 on a standard hardness scale, while exterior surfaces are slightly softer than 6.

Two cord-marked sherds were evidently tempered with shell. One has visible shell inclusions on exterior and interior surfaces and along broken edges, while the other shows lenticular leached spaces in a comparable size range to the piece with visible shell. These sherds are also very hard, and in surface treatments are impossible to differentiate from the five sherds with fine grit tempering material. Tightly spaced overlapping cord marks cover the exterior surfaces of all of these sherds.

Finally, one plain-surfaced sherd shows a large number of leached shell pores. This sherd is rather small, but is clearly not simply a reduced fragment of one of the cord-marked vessels.

The colors of the sherds with very hard surfaces are uniformly brown, while the clay and clay-grit tempered sherds exhibit yellow-red colors and zones of differential oxidation and reduction. The clay tempered sherd is from a depth of 30-40cm, thus representing the deepest sherd in the deposits excavated. The leached clay-grit sherds are from the front of the excavated area, three coming from the 20-30cm level and the other from the 10-20cm level. The remaining sherds are exclusively from the upper 20cm of the deposits, and are from the north edge of the excavated area toward the rear of the shelter and from the west end of the excavation.

It is not likely that the few vessels which found their way into these deposits were left by the same artisans. Within the minimum of five vessels represented in the sherd collection there are probably two groups of related vessels. The first is a pair of vessels represented in the clay and clay-grit sherds. The second is a group of three vessels representing a later visit to the shelter, perhaps by a somewhat different group of people. Nonetheless, there is a strong suggestion that the activities at the site involving the use of ceramic vessels did not change radically through time, and indeed, that such vessels were not of primary importance in the activities of the shelter.

Finally, an arc-shaped piece of clay with the broken outline of a perforation shows no visible tempering, but could be a fragment of a clay pipe. The piece is too small for even firm identification. The piece was found in square M2d, level 10-20cm.

Bone Tools

A smoothed, but somewhat battered piece of bone was recovered from unit J3d, level 20-30cm. This piece of bone is unusual in its size and location away from major bone concentrations in the excavated deposits. It consists of a small section of a longbone from a large mammal, possibly bison. One end of the piece is smoothly rounded, while the other has an angular concavity with no apparent modification. The piece has lateral striations and smoothed-over breaks which suggest use in fleshing or some other hide-working activity (Figure 15, h). Another large piece of bone, this one definitely a longbone fragment from a bison, was recovered from unit K2d, above the feature identified as a hearth. This piece has a spiral fracture on its broken end (see Figure 15, i), but no indications of use striations or polishing.

Beads

Two white trade beads, five tubular beads, and one small bone bead were recovered during the excavation. The tubular beads are of a purple and gray-purple color laminated with white. Three of these beads appear to have been burned. They are from 5mm to 6mm in length with diameters of 3mm. The bone bead has a diameter of 2mm but a thickness of less than 1mm. The other two beads are short cylindrical forms with diameters of 3mm and 4mm.

Distribution of Tools

The vertical distribution of tools at 34WN32 is shown in Table 6. Points and retouched pieces constitute the most prominent tools in the upper three arbitrary levels. It has already been noted that there is a difference in the density of non-tool elements above and below 20cm depth in the site. Additionally, there are differences in the tempering materials of sherds above and below that level, as well as differences in prominent point styles. Note on the table that 14 of the 18 thick-blank points and

TABLE 6

Occurrence of tool classes at 34WN32 by 10cm excavation levels.

Class	Level: 0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Scraper	3	3	2		1	1		10
Large Point			2	1	1		1	5
Small Point								
Thin-Blank	32	40	17	8				97
Thick Blank	1	3	8	6				18
Retouched Pieces	19	14	24	2	2	1		62
Perforator	2	2	1					5
Biface	1							1
Small Stemmed Tools	1			1				2
Notch	2					1		3
Varia	9	9						18
Drill Tip			1	1				2
Knife		1						1
Core		1						1
Gunflint	1							1
Pottery	4	5	3	1				13
Beads	6	1	1					8

point fragments were found below 20cm depth. The 20cm level is also the point where large points terminate, and the bone bead was found in the 20-30cm level. Finally, it is apparent from the data on raw material utilization that the upper 20cm of the deposits reflect a stronger orientation toward the raw materials of the western, Kay County area than toward the chert types located to the east in the northern parts of the Caddoan archaeological area.

These bits of information are more easily understood when considered against horizontal distributional data. The variation in chert types reflected in the vertical sample of debitage underscores the non-random horizontal distributions of lithic artifacts representative of activity differentiation within the small area excavated. Horizontal plots of debris and tools show some subtle, and in some cases striking patterns which make possible a number of inferences as to activities which were carried out within the excavated part of the site. Activity data relate to the accumulation of deposits and to general work-tasks carried on in the shelter. The accumulational data pertain to concentrations of burned and unburned bone, non-tool lithic debris, and roof-fall. Task assessments are arrived at through consideration of tool and debris associations.

The bone from each quadrant excavated was weighed and a plan-view distribution of burned and unburned bone was produced for each level of the excavation. Concentration data were contoured for each level. The upper three levels showed dramatic concentrations of bone in the central portion of the main ecavation unit (Figure 16, a-c). The uppermost arbitrary level of the unit displayed a concentration of unburned bone in those areas with the highest densities of animal remains, while the 10-20cm and 20-30cm levels displayed high-density areas of burned bone. Burned bone concentrations of these three levels appear to be related, moreover, and yield a composite contour pattern indicating two distinct concentration areas and a third high yield area which is probably peripheral to another unexcavated concentration (see Figure 17).

Similarly, lithic debris occurs in highly variable horizontal concentrations (Figure 16, d-f), distributed in space somewhat exclusively of the bone scatters (Figure 17). There are quadrant densities approaching 700 non-tool elements per level. This density is approximately four times that reported as the upper level densities per square meter in Table 1. Furthermore, there are some quads in the upper two levels with densities well under 100 pieces. As with

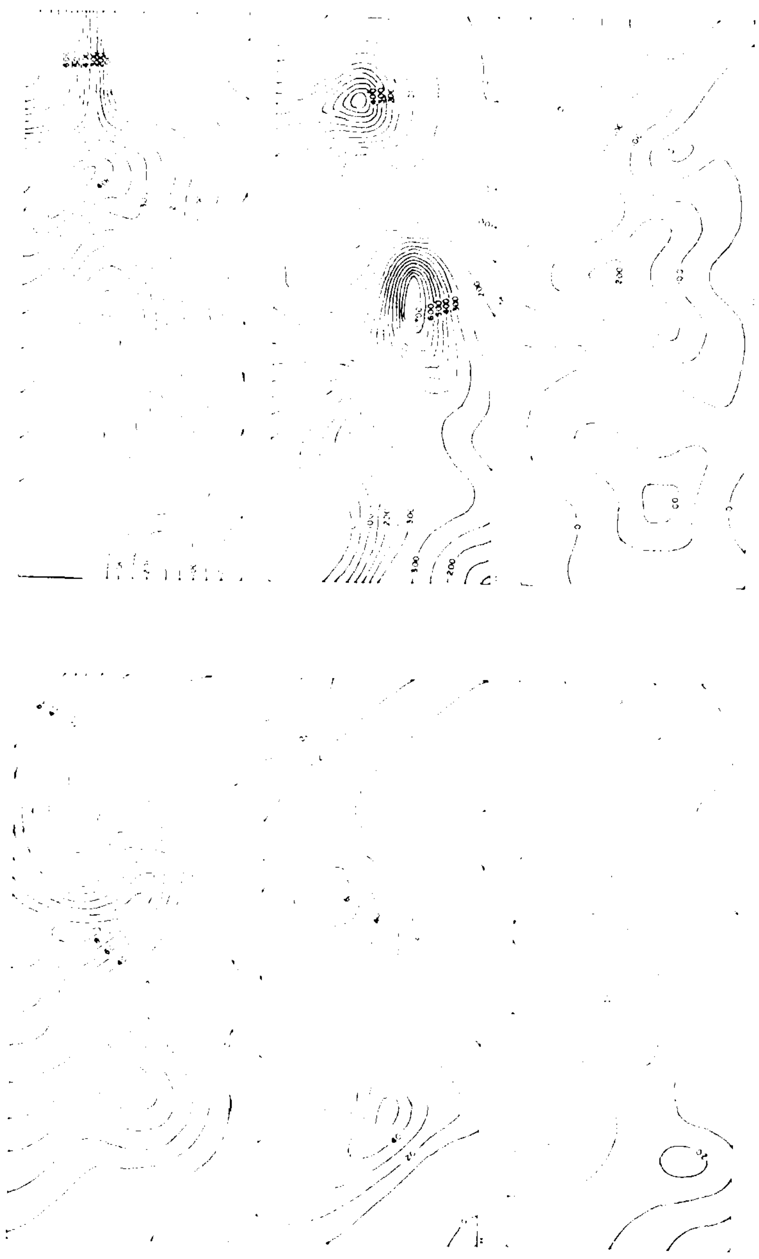


FIGURE 16. Bone and lithic concentrations in the main excavation unit at 34WN32 by level.

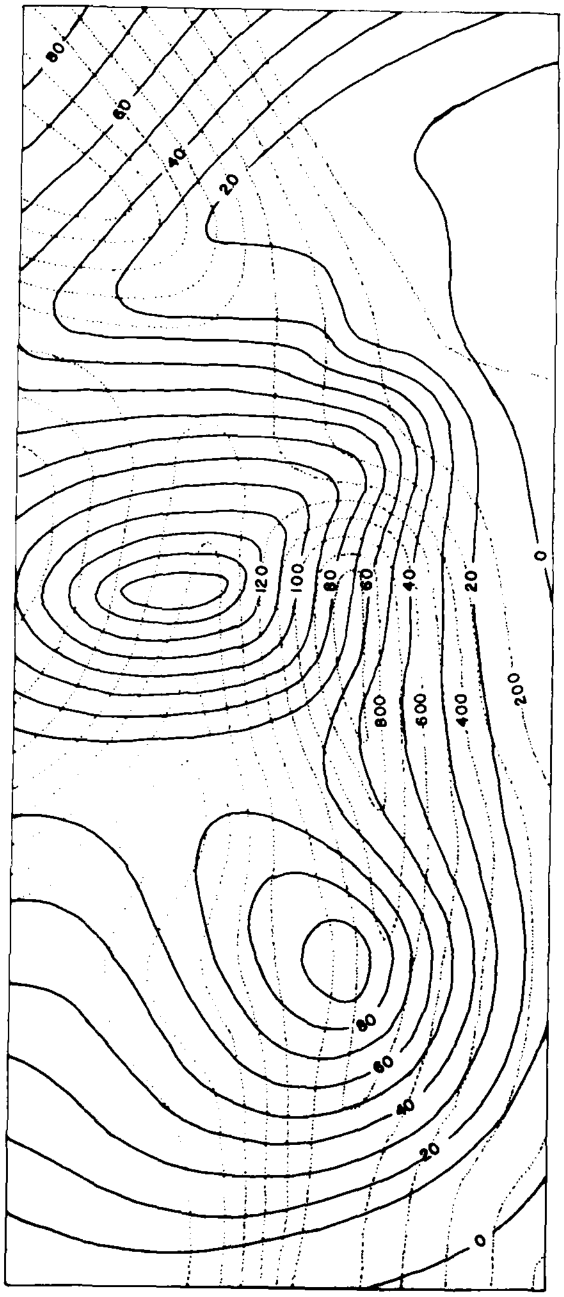


FIGURE 17. Lithic and bone concentrations of the upper 20cm in the main excavation unit at 34WN32. Bone depicted with solid contours; lithic debris shown in broken contours.

the bone concentrations, lithic concentrations of the upper levels appear to be closely related in pattern, yielding a composite density contour with two zones of very high concentration. Thus, five discreet areas within the main excavation unit at 34WN32 may be defined, representing three kinds of depositional contexts (Figure 17). Two of the areas are bone concentrations, two are lithic debris concentrations, and the last is a low density area for both classes of debris. These areas are valid for the upper 20-30cm of deposit. Below 20cm the concentrations of bone and lithic material are similar to the upper units, but in much less dense concentration. Below 30cm the amounts of lithic and bone debris show no strong concentration areas.

One of the bone concentrations occurs in square J3a. The second bone concentration is adjacent to the feature located near the center of the main excavation unit about 2m east of the other. In spite of the poorly defined characteristics of this feture, it is apparent that it was a hearth. The major lithic concentration is located between these two features, and most of the additional bone debris is located between the rear wall of the shelter and this lithic high-density zone. The second lithic concentration is located in units L2 and M2, on the northeast corner of the main excavation. On the extreme northeast of the trench in unit M2b there is a minor high density bone area of predominantly burned bone. This probably signals the location of yet another hearth in an area to the northeast which was not excavated. Toward the shelter opening on the west end of the excavation there are low bone densities but moderate concentrations of non-tool lithic debris, including a small concentration in unit I3a. Finally, toward the shelter opening on the east end of the main excavation is the zone with little concentration of either bone or lithic debris.

Of all the kinds of tool debris considered in this study, retouched pieces provide the greatest potential task-specific information. This is because the retouched pieces represent a variety of tool forms and fragments produced under different conditions of use. We might more formally state that if retouched pieces are sensitive indicators of activities, groups of pieces sharing specific attributes should occur in patterned distributions when the several types occurring at a particular site are considered against differential contexts. More specifically, we would expect the conditions under which abrupt, fine, and normal retouch are produced to differ markedly, and we might also expect the size and other attributes of pieces to pattern in various ways according to the tasks with which they were associated. Retouched pieces, by virtue of their numbers on 34WN32, also are the best materials in addition to points for which a concentration analysis can be conducted. Surprisingly, two rather distinct groups of retouched pieces occur at the site, corresponding roughly to the following units (see Table 7, a):

(a) the bone concentration on the west end of the excavation unit and the quadrants immediately surrounding it, extending to the western limit of the trench;

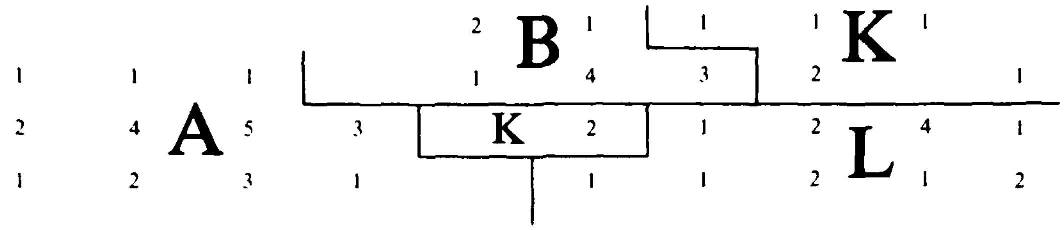
(b) the bone concentration and hearth in the center of the excavation unit, quadrants immediately surrounding it (including lithic concentration quadrants), and the general area of low densities on the open part of the shelter toward the east end of the trench.

Considered against the debris concentration of the main excavation unit, there is a striking difference in the incidence of different types of retouched pieces. For the purposes of presentation, the two high-density lithic debris areas are grouped as "knapping areas." The bone concentration areas are labeled "activity area B." The low density area, which as it turns out is also a tool concentration area in levels below 20cm, serves as the last unit of observation. Of particular interest are the association of fine retouch with activity area A and the relative lack of retouched pieces in knapping areas (see Table 7, b). Additionally, activity area B and the low density area account for the majority of normal retouched pieces, a group which is dominated by elements with bifacial-marginal retouched edges. Moreover, most of the bifacial-marginal, normal-retouched pieces are from the low density area.

These differences in the horizontal association of retouched pieces fit well with what we would expect given the bone and lithic debris concentrations of the small space being considered. First, we would expect retouched pieces with fine flake scars, unifacial or bifacial, in areas where minor cutting and scraping tasks were carried out. These areas should be discreet from knapping areas but should conform to some extent with bone debris. It should be noted then, that the highest frequencies of retouched

TABLE 7

Distributions of retouched pieces from main excavation unit at 34WN32.



Activity Area A: 24 pieces

Activity Area B: 11 pieces

Surface: 1

Knapping Areas: 8 pieces

Low Density Area: 15 pieces

Other Units: 3

a. Horizontal distribution of retouched pieces in the main excavation unit and counts of all pieces by area.

Activity Area A

	Inverse	Obverse	M. Bif.	Alter.
Abrupt Retouch	-	-	1	-
	-	1	1	-
Fine Retouch	8	5	3	1
	1	1	-	-
Normal Retouch	-	-	1	-
	-	-	1	-

Knapping Areas

	Inverse	Obverse	M. Bif.	Alter.
Abrupt Retouch	1	1	-	-
	-	-	-	-
Fine Retouch	-	1	1	-
	-	1	-	-
Normal Retouch	-	1	-	-
	-	-	-	-

Activity Area B

	Inverse	Obverse	M. Bif.	Alter.
Abrupt Retouch	-	1	-	-
	-	-	1	1
Fine Retouch	1	1	-	-
	-	-	1	-
Normal Retouch	1	-	1	-
	1	-	2	-

Low Density Area

	Inverse	Obverse	M. Bif.	Alter.
Abrupt Retouch	-	-	-	-
	1	-	1	1
Fine Retouch	-	2	-	-
	-	1	-	-
Normal Retouch	-	-	-	-
	-	1	7	-

b. Frequency of retouched pieces depicted through attribute matrix of Table 4, arranged by main excavation unit depositional context (includes only levels 0-30cm; N=55)

pieces in activity area A surround the high density area B. It is not surprising to see that the largest number of retouched pieces in the low density area were found in unit M in a rock scatter hearth in the 20-30cm level. If these concentration loci are compared with a plan view of the 20cm floor features and a plot of lithic tools, the beginnings of a working understanding of the shelter space excavated emerge (Figure 18).

The distributions of tools and debris suggest that most of the activities represented in the main excavation space were centered on the central hearth. Four possible work positions are located on the diagram. These are positions of low density tool material adjacent to major concentrations of tools and or debris. Position Ia-Ib is a knapping locus, as is clearly indicated by the debris. It encompasses the whole northeast corner of the excavation unit, and is probably ancillary to both the central hearth and hearth III. Position II is associated with the high-density bone area and produced the simple and triangular endscrapers (Figure 11, a and b), a perforator, the heavy denticulate tool fragment (Figure 15, d), the core (Figure 15, f), a notch (Figure 15, a), and 12 of the retouched pieces. This position essentially controls activity area II, although another position might well lie in the unexcavated portions of units I and J to the west which also relate to this bone scatter, and the notch and sidescraper in quadrant J2c. At any rate, Position II is located just inside the shelter from the hearth, and seems primarily concerned with initial meat processing, including perhaps marrow production from long-bones (such as that of Figure 15, i). This inference is in part based upon the quantities of bone debris in the immediate vicinity of the zone around the position.

Extending away from Position II toward the southwest corner of the main excavation unit is the continuation of the bone concentration which links the two activity areas. It is clear that the major tools of the 0-20cm deposits flank this bone scatter. Outside the bone concentration on the west of the central hearth is Position III. This position controls the knapping area in unit K2a and K2b, and the east half of activity area A. Around this position were found a perforator (Figure 14, f), part of a second perforator (Figure 14, d: the other half of this specimen is at Position Ia), two scraper fragments, a drill tip, one of the small stemmed denticulate tools (Figure 14, h), and 12 of the retouched pieces. On the southwest corner of the excavation unit is Position IV. Like positions II and III, this locus has a high density zone of lithic debris adjacent to it. In addition, Position IV yielded a sidescraper (Figure 11, c), and in the adjacent quadrants were found a perforator (Figure 14, e), the prismatic reto[illegible] flake knife (Figure 15, c), the bone tool (Figure 1[illegible] h), and 9 of the retouched pieces. Both Positions I[illegible] and IV appear to be associated with meat processing, marrow production, and possible small pelt preparation. The sidescrapers and bone tool might especially be used in the latter activity.

It is apparent that these suggested work positions, especially II, III and IV, involve specific range of tools and activities. Although a more general series of tasks might have been accomplished in the shelter, the section excavated seems representative of strongly specific work. The only part of the main excavation unit which differs is the low-density area. This area seems not to have had any specific functional loci except the large rock hearth in unit M. The relationship of this area to the lower deposits is interesting, however.

The distributions of small projectile points of the thick-blank and thin-blank groups are presented by level in Figure 19. It is clear that the points of the upper 20cm do not show particularly strong concentrations conforming to the activity areas just described, except that there are very few thin-blank points in the low density area. This is in part the result of a relatively high occurrence of roof-fall in the deposits, and in part the result of the placement of Hearth III. Note that in the 20-30cm level there are thick-blank points peripheral to the hearth, but in the 30-40cm level four of the thick-blank points are beneath the hearth deposits. This may be interpreted in two ways. First, the hearth may be associated with the thick-blank points (and clay-grit or clay-tempered ceramics), and originate only fortuitously near the 20cm level. Second, the hearth may originate from the upper unit. Because of the proximity of the central hearth and the lack of thin-blank points and other refuse in the feature, it seems more likely that the hearth is associated with the termination of the occupancy which produced the thick-blank points. On the basis of projectile point forms, ceramics, and contextual considerations, the deposits between 20-40cm are identified as a Plains Woodland component. This component is mixed

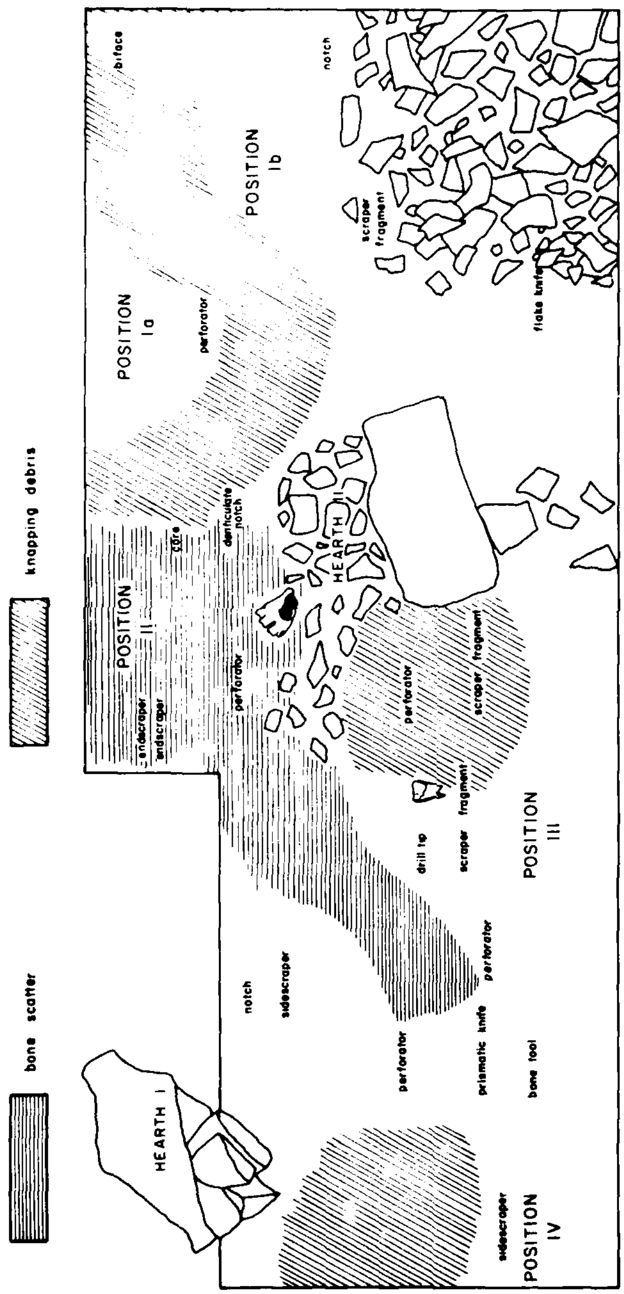


FIGURE 18: Work-area positions surrounding the bone scatter of the central hearth, main excavation unit, 34WN32.

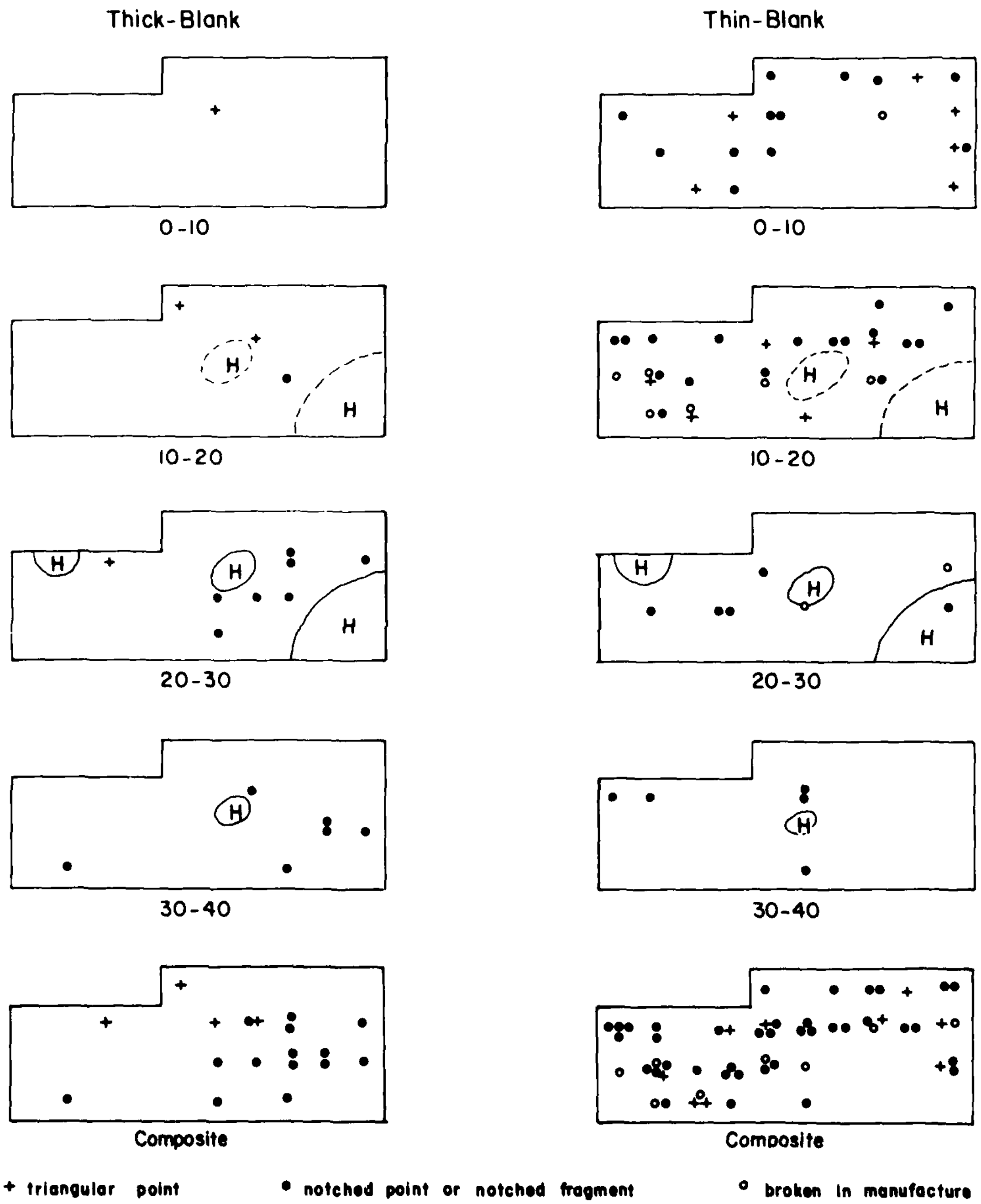


FIGURE 19: Horizontal distributions of thick-blank and thin-blank projectile points displayed by level.

with earlier and later materials in the shallower R and W excavation units. But it is clear from the main excavation unit that below the Plains Woodland component identified here there is an earlier occupancy involving large projectile points and no ceramics perhaps a very early Plains Woodand or late Archaic use of the shelter. The upper deposits are assigned to the broad potential range of Plains Village cultures, although it has already been noted that the people involved found their way to the Little Caney valley mainly from the west.

In summary, then, 34WN32 is a multi-component site in which there are four major units: (a) an early occupancy as yet undefined; (b) a late Plains Woodland unit represented by small side-removed and corner-removed points, clay and clay-grit tempered, cord-marked pottery, and moderate accumulations of debris; (c) a long-term, probably intermittent occupancy by Plains Village peoples who were somewhat more focused toward the west than their predecessors, and (d) a terminal occupancy by Plains Village peoples on a protohistoric time level. The Plains Village groups are represented by small triangular and notched points, a rather full tool-kit of scrapers, perforators, knives, pottery—still cord-marked but more effectively tempered with grit and/or shell—and on the protohistoric level, beads and guns. It is apparent from the quality of lithic debris that the site was used for sharpening and maintenance of tools rather than as a locus for complete reduction of raw materials. Indeed, the overall quality of the remains suggests that the site area excavated represents somewhat specialized activities in meat, bone, and hide processing. This specialization resulted in rapid cultural deposition, possibly coupled with an actual slow-down of natural sedimentation within the shelter after about A.D. 800.

34WN68 Excavations

Site 34WN68 is a large open site situated on the west margin of the Little Caney River floodplain. The site rests on a long extension of the valley-edge deposits forming a low ridge around which are floodplain sediments. The relief at the site is accentuated by a field channel which hugs the high ground of the site in a broad arc from the north, around the east end of the ridge and on to the south where it joins a larger, broader channel (Figure 20). The site was sounded in seven locations on the ridge crest through hand-excavated one-meter squares. These squares were intended to test the depth and extent of fired rocks visible on the surface. In addition, two backhoe trenches were placed on the north and east margins of the ridge.

Excavation of the squares on the top of the ridge was conducted using the same basic techniques employed at 34WN32 and other sites of the Copan Lake investigations. Each square was divided into quadrants and all matrix was collected for water screening. All squares were excavated in the same series of levels as follows: (a) the first 25cm was removed as a single unit, exposing or striking slightly above a heavy deposit of sandstone cobbles; (b) subsequent levels were taken in 10cm increments. Very little material was encountered in the deepest levels excavated; the depth of excavation was constrained in part by the high water table and in part by time limitations. Matrix was transported to the Laboratory of Archaeology for processing.

The first backhoe trench was placed to determine the nature of a soil anomoly which appears on the area contour map as a spur extending north from the zone representing the limits of the heavy concentration of cultural deposits and the limits of the drainage channel. The second trench was placed from the lower edge of the site on its east end to well within the drainage channel. Both of these trenches were excavated to the water table which was quite high at the time the work was accomplished. Additional probes were made at the base of Trench 2 under drier conditions.

Stratigraphy

The testing operations at 34WN68 yielded preliminary information on stratigraphic units which pertain to the valley sediments, soils, the structure of the ridge on which the site is located, and cultural activities. The basic stratigraphic relations of the site consist of the parent ridge unit (probably floodplain unit C in Hall's 1977 terminology), and a capping unit of cultural debris and colluvium, the whole surrounded by recent floodplain deposits. These basic relationships are detailed in Figure 3 (diagrams b-d). Indeed, the site is shown in its initial stages of deposition to rest on a soil development. This soil is manifest in all of the test units as a brown silty clay under the major cultural deposits, which

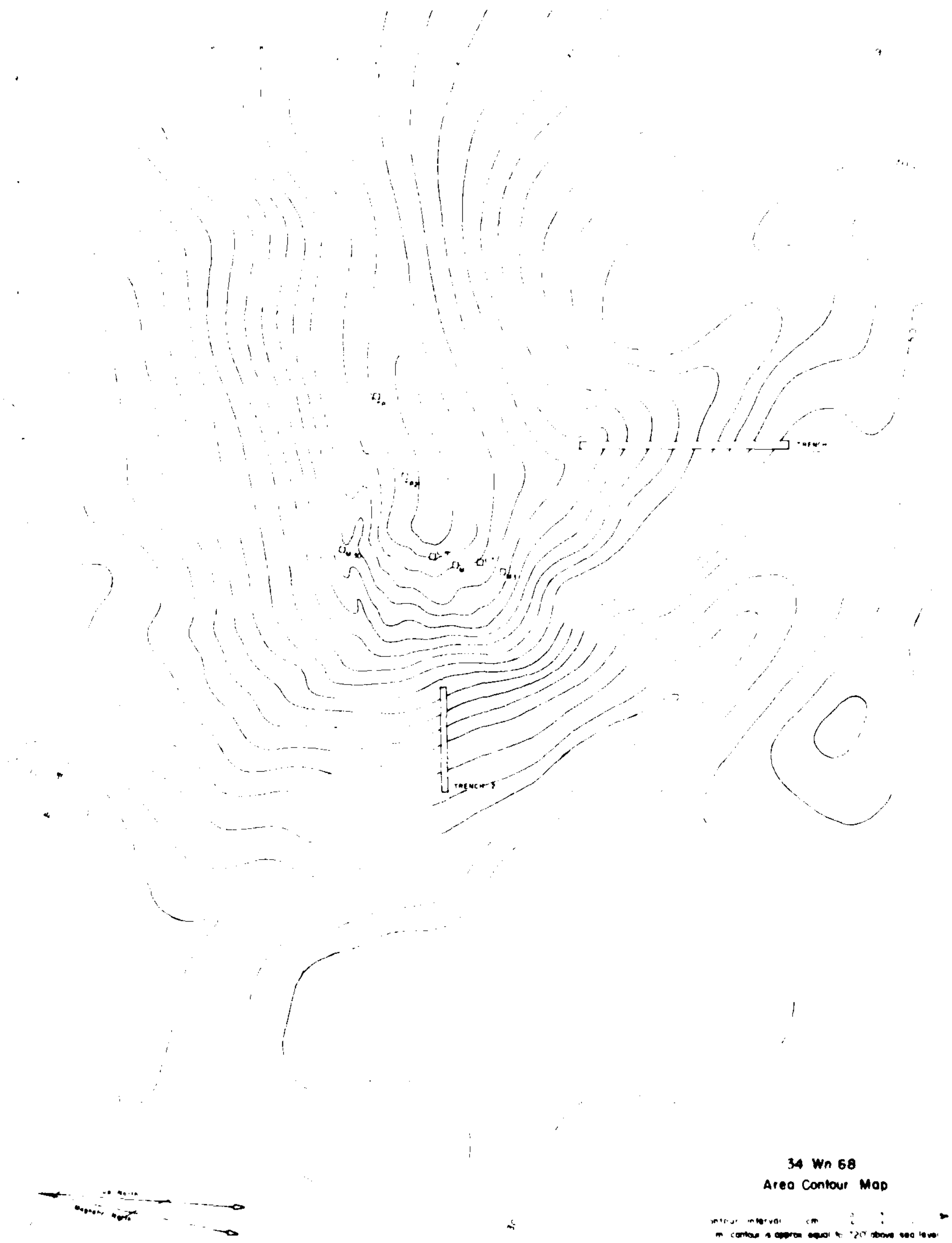
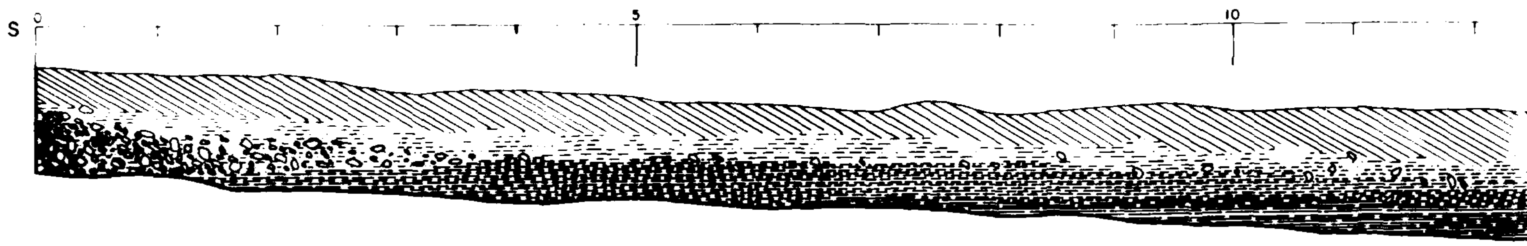


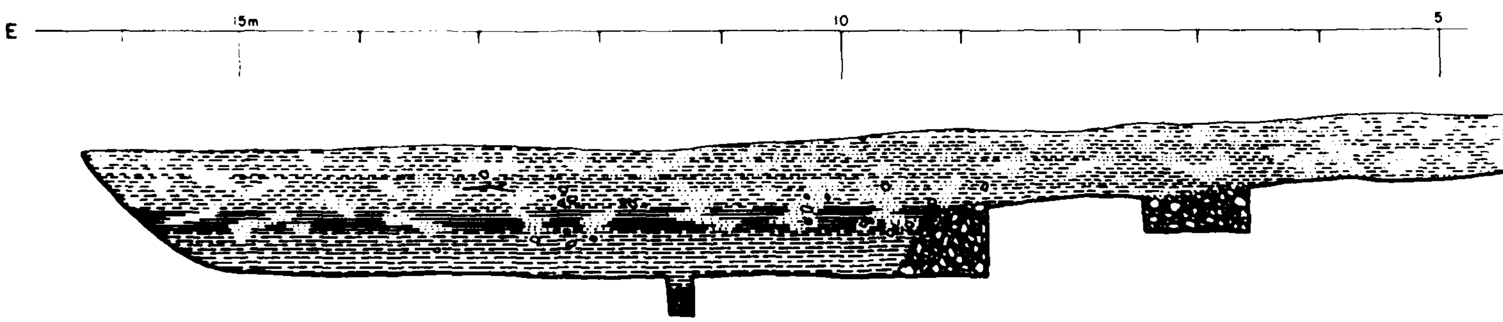
FIGURE 20: Excavation units at 34WN68.

CROS

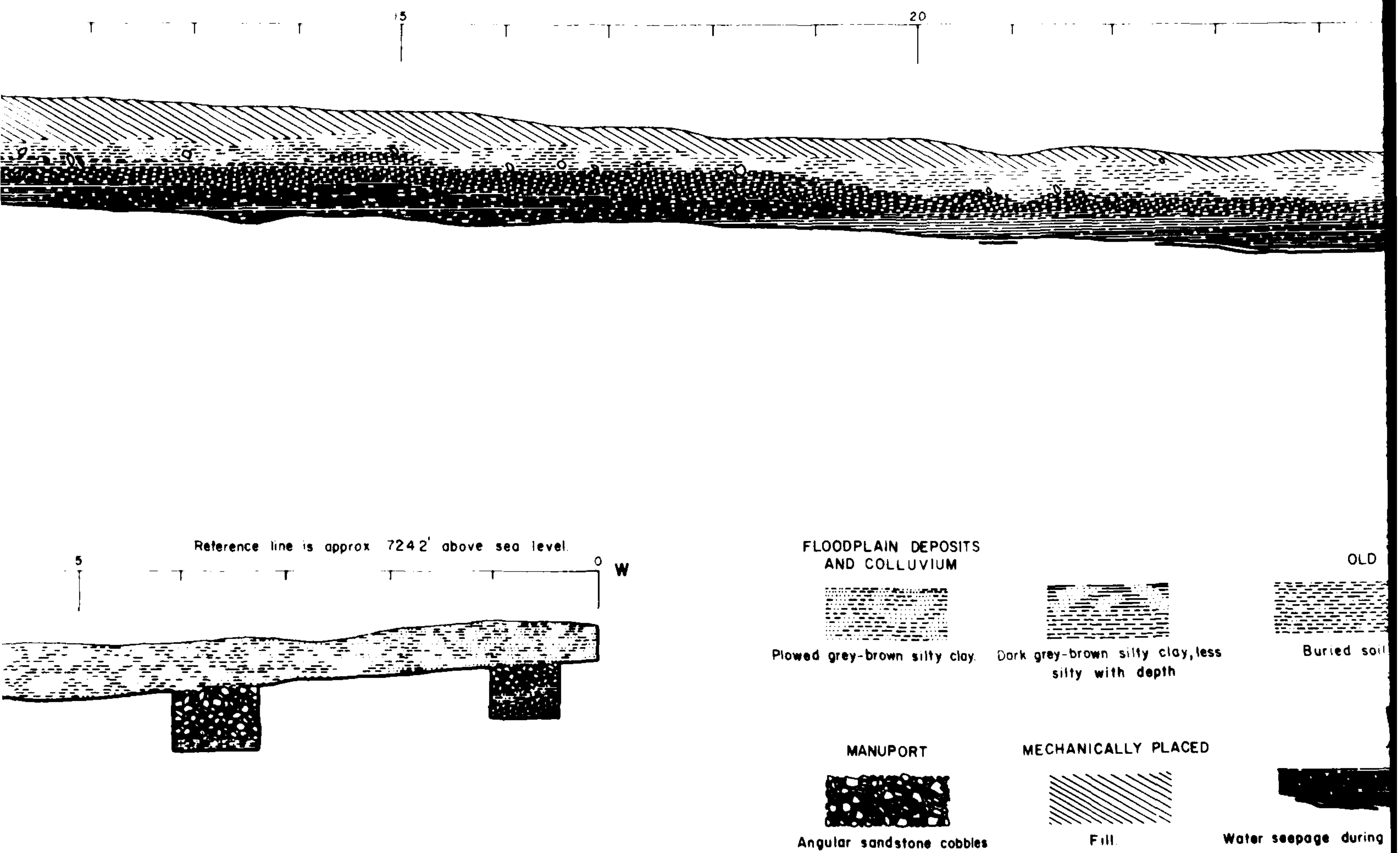
Trench I



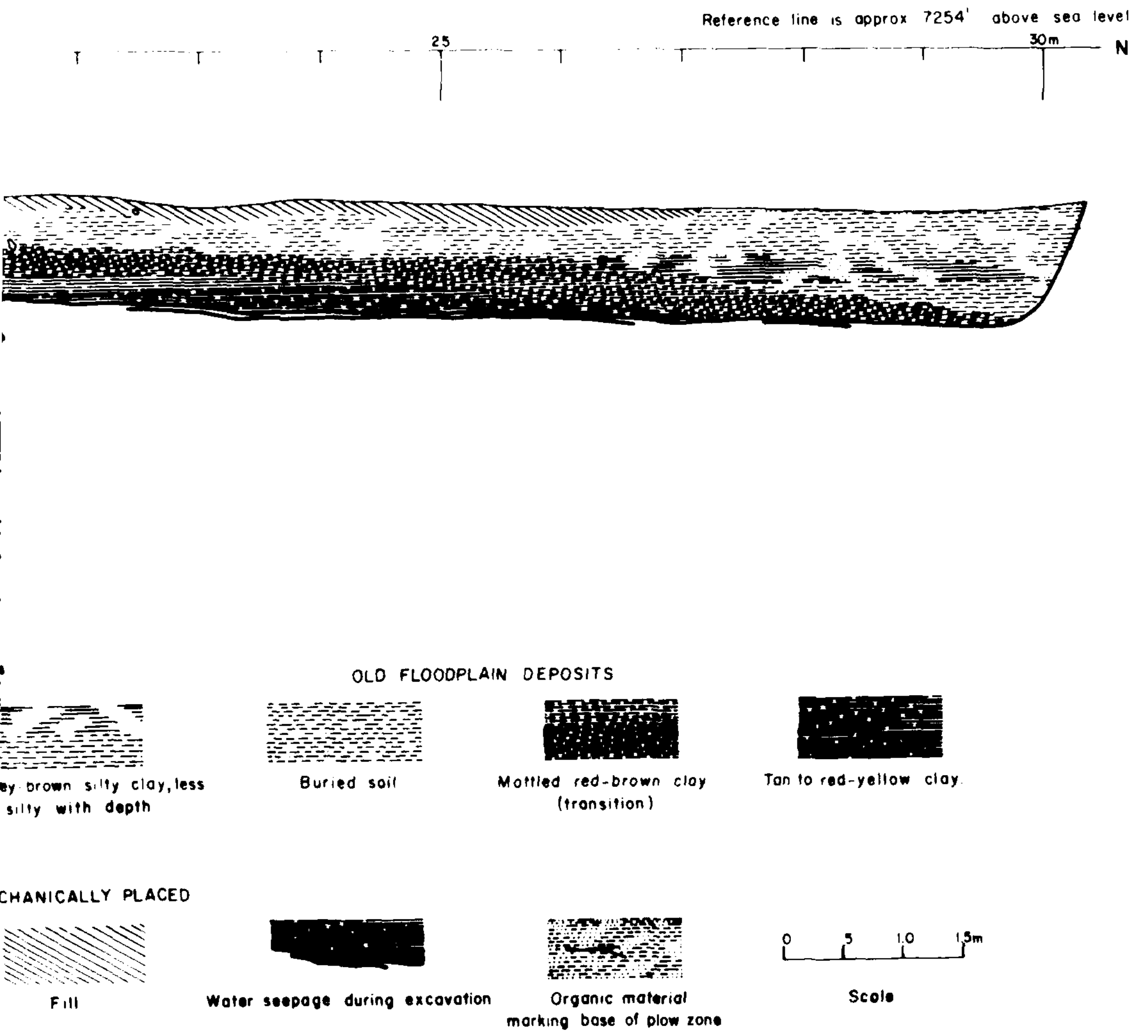
Trench II



34 Wn 68
CROSS SECTIONS OF BACKHOE EXCAVATION



2


Reference line is approx 7254' above sea level
25
30m
N
OLD FLOODPLAIN DEPOSITS
ey brown silty clay, less silty with depth
Buried soil
Mottled red-brown clay (transition)
Tan to red-yellow clay
CHANICALLY PLACED
Fill
Water seepage during excavation
Organic material marking base of plow zone
0
.5
1.0
1.5m
Scale

3

rapidly undergoes a transition to a red yellow clay which appears to be a B horizon. Below this unit is a tan to yellow parent material.

The stratification of the two backhoe trenches (Figure 21) illustrates some of the potential relationships between the valley sediments and the paleosol at 34WN68. Trench I intersects the rock layer which represents the primary cultural deposits at the site on its south end. From that point rocks are scattered to the north at the contact of a plowed gray-brown silty clay and a mottled red-brown transition unit, a clay comparable to the B horizon unit in the ridgecrest units. The upper unit of this trench is a local dump zone of yellow fill dirt, evidently placed to lessen the slope of the ridge either as an aid to plowing or to thwart gulleying. Thus, the zone in Trench I which has been impacted by plowing runs to almost 3/4 meter in depth at a few places along the trench. In this locality, then, the floodplain sediments on the north end of the trench intergrade with the plowed silty clay. However, the red-brown clay which appears to be a paleosol extends under the deeper floodplain materials on the extreme north end of the trench.

Trench II shows the relationships of the hillslope, cultural deposits, and floodplain deposits in greater detail. On the east end of the ridge the slope toward the floodplain is less gradual, especially at the contact of the rock unit of the cultural deposits and the sub-rock deposits. The brown soil unit and the red B horizon appear in the hand excavated tests at the west end of the trench, capped by a thin layer of rocks. Closer toward the center of the trench the rock unit thickens to form a talus toe, and in the area of the field channel a thick, dark gray-brown silty clay extends in depths to about 1.2m below surface. Immediately below this clay is a mottled red-brown zone, poorly sounded after the water table had lowered during the Fall months. In this locality, although it is not absolutely certain that the red-brown unit extends all along the trench, the rocks are shown to cap a soil comparable to the soil-stratigraphic unit farther up the ridgeslope.

These stratigraphic data suggest that the cultural deposits of 34WN68 were placed on a high remnant of early floodplain material supported by soil development prior to occupancy, and perhaps even during the period of occupancy. The site was then capped by colluvial deposition from the long valley margin slopes above, as well as to a limited extent by floodplain deposition. The floodplain margin was obscured by plowing, while floodplain deposition and gradual soil accretion created the thick, weakly structured soil profile which is noted in Trench II (east end), and at measured section S 2 located about 1/4 mile away (see Figures 1 and 2). Such an interpretation would place the initial major occupancy of 34WN68 sometime early during the formation of the Copan Paleosol, or about A.D. 1, if not earlier. The possibility that the soil under the cultural deposits is earlier than A.D. 1 is relatively great, since a soil which was capped earlier than the formation of the Copan soil unit might still interfinger with it under the geomorphic conditions of the upper Little Caney valley. There is strong evidence in the more general stratigraphic units of the upper valley for long periods of relatively stable surfaces—slowly aggrading lowlands with slowly wasting uplands. It appears that only under rather local geomorphic conditions do periods of rapid filling occur which produce such units as the Copan paleosol in the southern end of the Little Caney valley, although such conditions may be seen often in all levels of major tributaries of the region.

Ultimately, the questions surrounding the dating of the landsurfaces associated with 34WN68 will be solved by radiometric assays. For the present the assessment which most fits the artifactual data is that the site dates to a late Archaic or early Woodland time frame, more likely the latter. Thus, it seems likely too that the simpler of two geologic possibilities fits best, and the estimate that cultural activity began at the time sometime shortly after A.D. 1 must stand provisionally.

Cultural Deposits

The primary cultural deposition of 34WN68 is clearly the heavily concentrated rock layer. It is suspected that these rocks represent a series of coalescing scatters, perhaps with well defined pits beneath them in some localities, on the upper portions of the ridgecrest. Toward the eastern end of the site the thickening discovered in Trench II suggests that either the activities which caused the rocks to be placed on the site were more intense, or that the ridgecrest activities involved some cleaning, culling, pitching, or other process which might cause accretion of a rock dump. Such precise assessment of the cultural deposits must await fuller

excavation, although it is fair to say that some evidence of differential scattering was recovered in the hand excavated tests. After reviewing the artifactual data recovered from the site a number of hypotheses for future testing are suggested.

Recovered Artifacts

Only chipped-stone tools and debris were recovered from 34WN68. During the fieldwork and in the laboratory numerous pieces of sandstone were examined for evidence of grinding. No pieces of convincingly ground stone were found. Because of the widespread, but consistently stratified deposits of the test pits placed on the ridge, the tools from 34WN68 are presented in stratigraphic order, without regard to the particular pits from which they came. This is with the exception of certain distinctive clusters of material. Thus, where it seems appropriate, the test pit number is provided in the figure captions. It should be noted here, however, that unit M30 yielded only one tool and unit M3 yielded only eight. The major producing tests were units L7, M11 and L15. Test Pits 1 and 2 yielded seven and ten tools, respectively. It is also interesting that a pair of flakespalls from the 25-35cm level of unit L15 and the 0-25cm level of Test Pit 1 (see ahead, Figure 23, i) were found to fit together. This may be more indicative of cultural activity than plowing, although plowing disturbance seems a ready explanation.

Chipped-Stone Assemblage

A total of 26,600 artifacts were recovered from 34WN68, 114 of which are tools and fragments of tools. The densities and distribution of non-tool lithic elements are shown in Table 8. Of immediate interest in these data is the low density of elements in the 0-25cm level. This level represents the removal of matrix to the top of the rock unit, essentially the plow zone. The density of materials suggests that the site was capped after its terminal use, and that disturbance by plowing of the lightly capped rock unit produced the upper unit in part through the gradual, relatively ineffective scattering and breakdown of the rock unit. The rock unit, nonetheless, is the primary locus of flake materials, especially the upper part of the deposit. Below the rocks in the 45-55cm level the non-tool element densities are reduced. From the point of view of testing for possible Archaic occupancy in the Little Caney Valley, it is encouraging that a few non tool elements continue through the depth of 85cm below surface.

The regular but low occurrence of primary and secondary flake elements presents some potential contradictions in analysis. On the one hand, there is ample evidence that 34WN68 was the site of initial reduction of raw materials. On the other hand, the frequencies of secondary elements is lower than at 34WN32. The presence of primary flakes and the absolute volume of lithic material argue for a rather complete lithic reduction routine at the site. The close association of the lithic debris with the sandstone cobble unit, moreover, and the large amount of Kay County chert with indications of heat treatment argue that the site was a lithic processing station of some proportions. It is argued below that the low incidence of secondary flakes is a function of the low incidence of core materials *per se*. As it turns out, the raw materials being processed at the site were quickly reduceable to tertiary class material.

Metrical data were developed for 34WN68 on the basis of a 25% sample of quadrants as follows: 7 quads from the 0-25cm level, 7 quads from the 25-35cm level, 7 quads from the 35-45cm level, 7 quads from the 45-55cm level, 5 quads from the 55-65cm level, and 1 quad each from the remaining levels through 95cm depth. These data (Table 9; Figure 22) show a broad range of sizes for both tool and non-tool elements. Data in the sample for primary and secondary elements are marginal, and the firmer data for tertiary and bifacial thinning elements indicate that flake dimensions do not form the very tight clusters found at 34WN32. It is informative that the dimensions of the surface sample (circled in Figure 22) cluster across non-tool element classes (dimensions for tools from the surface are not included in Table 9 or Figure 22). Tools average slightly larger overall at this site, and the whole character of the information derived from dimensional assessment suggests initial processing of raw materials. This seems particularly indicated by the lack of strong overlap between tertiary elements and bifacial thinning elements—the larger and more variable bifacial thinning elements result from the trimming of larger tool elements.

Chipped-Stone Tool Descriptions

The 114 chipped-stone tools from 34WN68 are

TABLE 8

Non-tool Element Densities, Counts, and Frequencies from 34WN68. Non-tool density is based upon number of elements per 0.1 cubic meter of excavated fill.

Level	Quads	Non-tool Density	Primary		Secondary		Tertiary		Bifacial Thinning		Chunk		Total
0-25	17	798	14	.2	71	.8	8031	95	271	3.17	75	.9	8462
25-35	28	1354	40	.4	119	1.2	9012	95.1	300	3.2	10	.1	9481
35-45	28	950	11	.2	79	1.2	6329	95.1	229	3.49	7	.1	6655
45-55	28	205	4	.3	13	.9	1319	92.3	91	6.47	1	.1	1428
55-65	19	86.9	0	0	17	4.1	369	89	16	3.9	11	2.7	413
65-75	3	36	0	0	0	0	24	0	1	3.77	2	7.4	27
75-85	2	40	0	0	1	5	16	0	0		3	15	20

classified in the same manner as tools from 34WN32. For convenience of presentation and in the interest of accurately portraying the stratigraphic relations of groups of tools all of the specimens are presented by level. Unless otherwise noted, the raw material of specimens described is Kay County chert.

Surface Materials

The surface materials from 34WN68 include 39 tools. These consist of five points, one drill tip, three scrapers (one with a notch edge), eleven biface tools, one core element, and seventeen retouched pieces.

The points include four basal sections (Figure 23, a-d), one of which (d) is of Shidler chert, and a notched piece which appears to have been aborted during manufacture (Figure 23 e). The drill tip is made from a white unidentified chert.

One of the scrapers is produced on the sharp edge of a snapped flake (Figure 23, f). This tool also exhibits a notch edge. The other two scrapers represent short lengths of edge on broken pieces of what were probably shaped forms.

Four of the biface tools are broken fragments of long, thick lanceolate forms. Three are undifferentiated pieces. Three of the others are rectangular pieces retouched on three sides and knapped on the fourth. These may be bases of large points such as that shown in Figure 23, d. The other biface has not been completely trimmed, but shows evidence of either preparation for trimming or use on the thick platform of the original flake blank (Figure 23, g).

The core element (Figure 23, h), is of Keokuk material and retains one small piece of original cortex material. This is the only actual core which was recovered from the testing, in spite of the very large quantities of lithic material at the site. It is probably significant that this piece is not of Kay County material, for as we have noted above there is evidence that the western cherts were being worked directly into usable large flakes.

Level 1 (Plow Zone): 0-25cm Below Surface

The uppermost level of the site yielded two

TABLE 9

Dimensional Data on Unbroken Tools and Non-tool Elements from 34WN68

	N	Length/mm X	Length/mm S.D.	Width/mm X	Width/mm S.D.	Thickness/mm X	Thickness/mm S.D.
Surface							
Primary	2	20.0	8.5	14.0	4.2	.26	.16
Secondary	8	21.0	10.4	15.9	8.4	.33	.14
Tertiary	82	14.4	6.3	12.6	5.1	.23	.10
Bifacial Thinning	11	19.2	8.6	15.0	7.0	.22	.09
Level 0-25							
Tools	21	21.9	9.8	20.8	6.7	5.66	2.50
Secondary	3	8.7	3.5	11.7	3.5	.21	.08
Tertiary	93	6.0	3.2	5.2	2.5	.10	.05
Bifacial Thinning	20	7.0	3.5	6.1	4.0	.11	.11
Level 25-35							
Tools	21	21.1	7.1	18.1	5.5	4.63	1.71
Primary	1	5.0	-	10.0	-	.20	-
Secondary	3	8.0	3.0	8.7	1.5	.17	.03
Tertiary	102	6.3	3.9	5.5	2.4	.10	.03
Bifacial Thinning	22	10.3	6.8	7.5	4.2	.13	.06
Level 35-45							
Tools	10	20.0	6.1	21.2	6.2	5.09	1.57
Secondary	4	11.8	9.1	9.8	6.3	.14	.06
Tertiary	76	5.8	3.2	5.7	3.1	.10	.05
Bifacial Thinning	19	8.7	5.5	7.4	4.1	.11	.05
Level 45-55							
Tools	3	33.3	12.0	25.0	3.5	9.73	2.35
Secondary	1	2.0	-	2.0	-	.05	-
Tertiary	33	4.2	2.1	4.1	1.6	.08	.04
Bifacial Thinning	10	8.2	3.2	7.7	3.5	.14	.07
Level 55-65							
Tertiary	19	4.6	2.4	3.6	1.9	.08	.04
Bifacial Thinning	2	4.0	1.4	3.0	1.4	.08	.05
Level 65-75							
Tertiary	2	8.5	.7	6.0	1.4	.08	.03
Level 75-85							
Tertiary	2	3.0	1.4	2.0		.04	.01

projectile points, one tang from a point, one point tip, one perforator tip, six biface tools, three scrapers, seventeen retouched pieces, and two very small unclassed tool elements. One of the points is a small dart point with corner notches producing slight tangs (Figure 24, a). This point has a slightly convex stem base and slightly convex blade edges. The other point (Figure 24, b) is produced from Keokuk chert and has a straight stem produced by side removal. The point is rather weakly shouldered. The blade and stem edges are well finished bifacially, but the base is unthinned because of an imperfection in the chert. It is apparent that the point of impact of the initial flake blank was at the stem end of the point, but that attempts to thin the base were limited to a few spalls each of which terminates in a step-

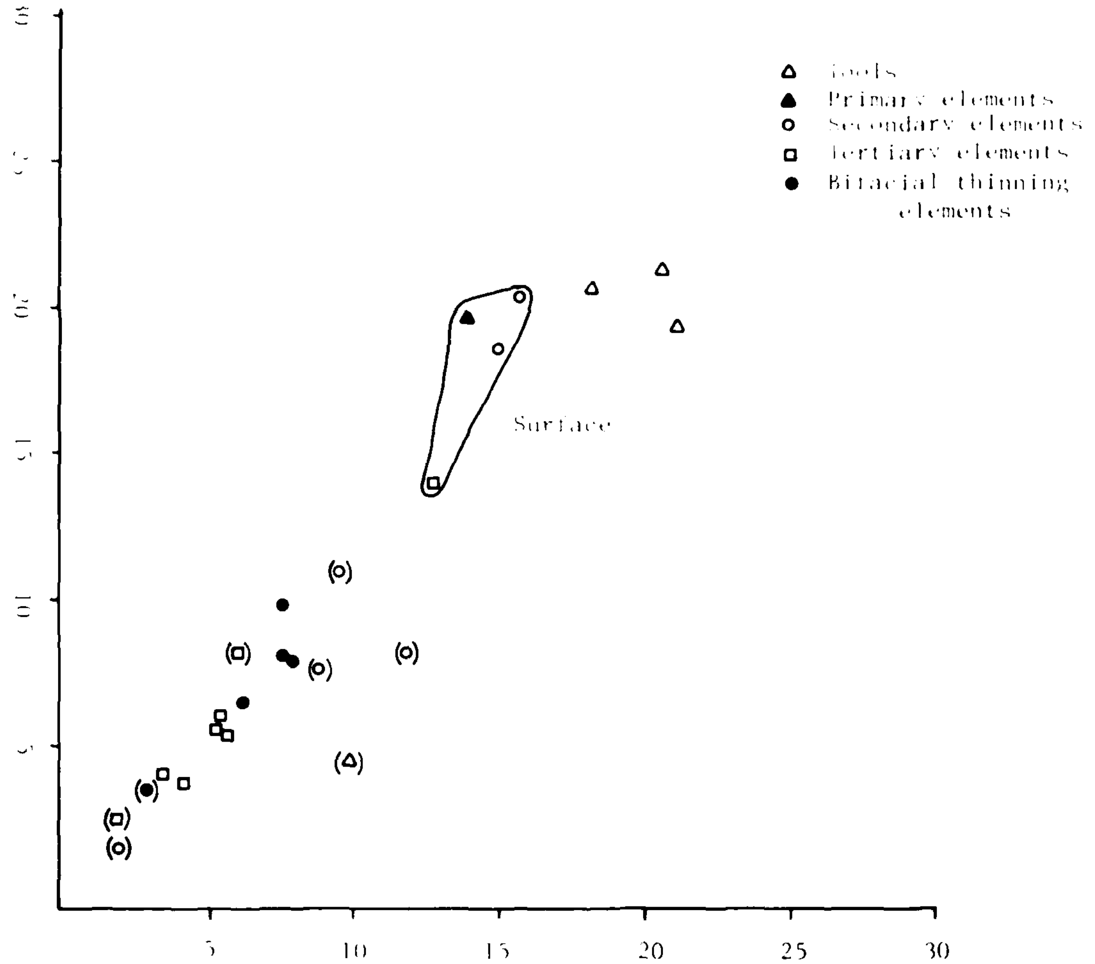


FIGURE 22 Mean length and width dimensions of tool and non tool elements from 34WN68 by arbitrary levels (levels with fewer than 5 elements shown in parentheses).

fracture.

The perforator tip was also produced from Keokuk chert.

There are four marginal edges of bifacially flaked tools which are too small for subclassification. One of these is of an unidentified yellow chert. The other two bifaces include a marginally trimmed flake struck from a well prepared platform (Figure 24, c). The other (Figure 24, d) is made from Keokuk material and represents the tip of a well thinned biface knife.

Scraper edges occur on one small chunk of material, and two fragments of end scrapers were found. One of these is a heavily burned piece of Kay County material which appears as a very dark gray with brown cortex (Figure 24, e). A portion of the edge of this scraper has been broken out. The other piece is the distal end of a similar scraper (Figure 24, f).

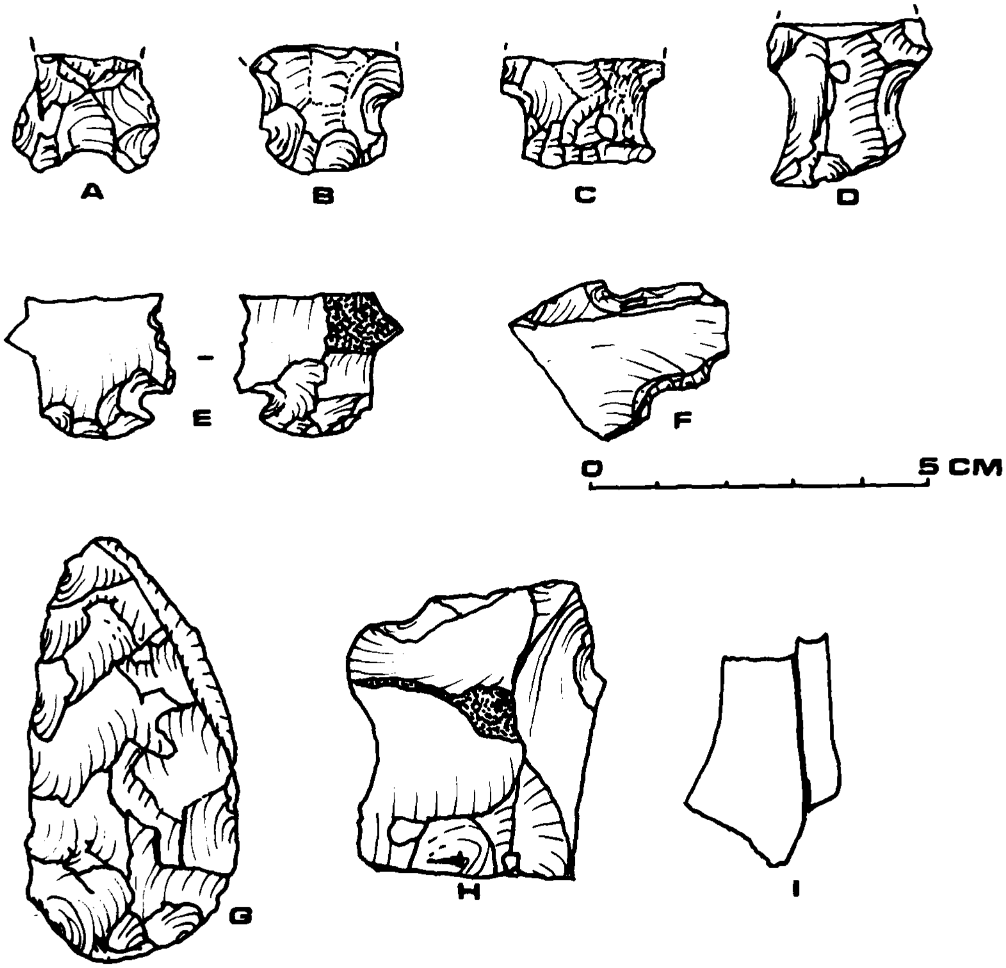


FIGURE 23: Chipped-stone tools from 34WN68. Points, a-d; notched pieces, e: scraper-notch, f: biface, g: core, h: retouched-piece fragments recovered from TP1 and L15c in the plow zone.

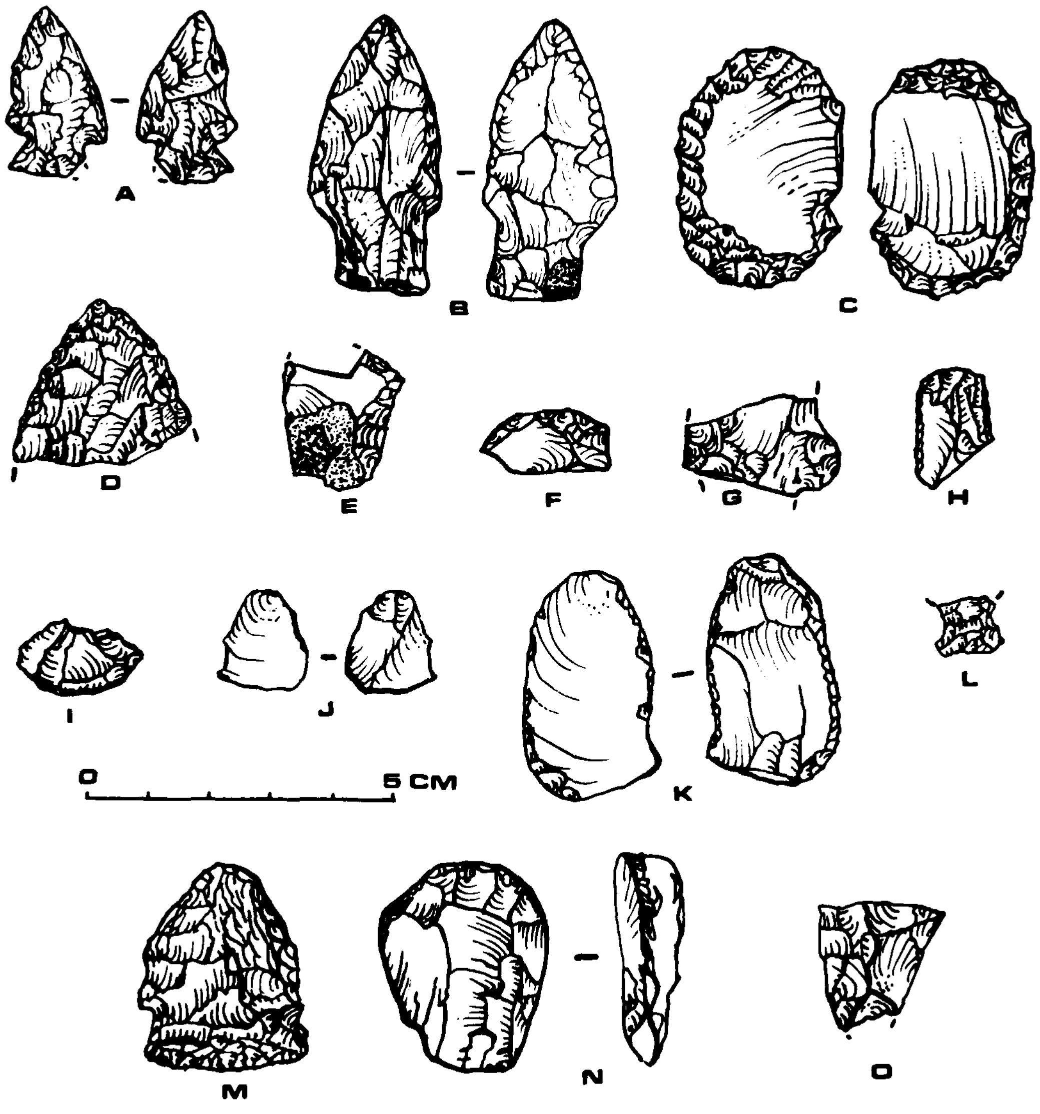


FIGURE 24. Chipped-stone tools from plow zone, 34WN68. Corner notched dart point, a; straight stem projectile point, b; marginally trimmed flake biface, c; thinned biface knife tip, c; end scraper fragments, e-f; point blade, g; fine retouched flake scrapers, h-k; point stem, l; point, m; end scraper, n; biface fragment, o.

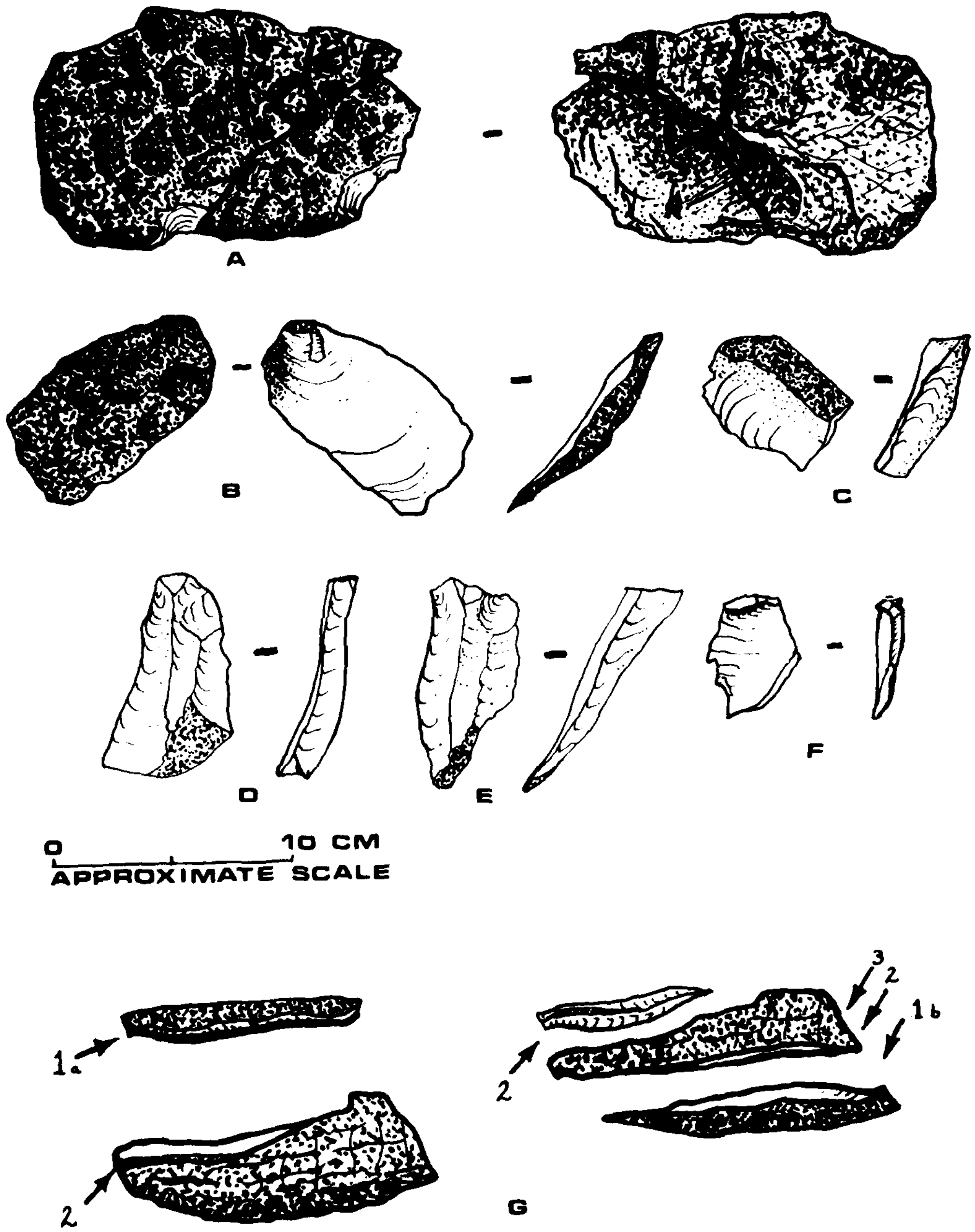


FIGURE 25: Raw material and large flake concentration from unit L15, 34WN68, showing production sequence suggested by the cluster.

Level 2, (Upper Rock Zone): 25-35cm Below Surface

At the depth of 25cm below surface the tightly packed rock layer began in the hillcrest test pits. The level represents the upper portion of the rocks which are about 20cm in overall thickness as a unit. The rock unit has been relatively resistant to plowing. The level yielded one point blade, one point base, one point tip, six biface tools, one scraper, eighteen retouched pieces, and three very small unclassed tools.

The point blade is from a small dart point made from Keokuk material. The base (Figure 24, g) is the broken section of what was apparently an expanding-stem form with a convex base. The biface fragments are untyped, but two are made from Keokuk chert, while a third is made from Shidler chert. The scraper edge is on a short length of a chunk of material; the original tool appears to have been shaped, but it is impossible to assign the piece to a type with any certainty.

Three of the retouched pieces represent well defined retouched flake scrapers, while a fourth represents a flake knife (Figure 24, h-k).

Also at this level a concentration of raw material spalls and large flakes was recovered in unit L15c. The concentration (Figure 25, a) consists of four pieces of raw Kay County chert which fit together. These pieces have not had flakes removed from them. With these pieces of material are ten large flakes, including one primary, two secondary, six tertiary and one bifacial thinning elements, (Figure 25, b-f). Long attempts failed to produce any fitting pieces, but the differential coloring resulting from heat-treated spots on the material allowed the orientation of many of the flakes. It is apparent that the raw-material trimming process used with chunky slabs of chert such as that recovered involved working a single edge backward, utilizing the upper or lower cortical surfaces as natural striking platforms (Figure 25, g).

This concentration clearly points to activity differentiation on the site, although it also shows some of the specialization of the locality. Most of the sandstone from 34WN68 appears to have been burned (see discussion of sandstones at 34WN64). It is likely that at least some of the rock scatter on this site is associated with chert kilns or some other such firing features designed for heat-treating chert.

Level 3 (Lower Rock Zone): 35-45cm Below Surface

In the base of the rock scatter only a few tools were found. These include one small point stem of Keokuk chert (Figure 24, l), two biface fragments also of the Keokuk material, and two retouched pieces.

Levels 4-8 (Sub-Rock Zone): 45-95cm Below Surface

Three tools were found at depths greater than 45cm. One of these was a well-formed point with a broad stem and weak shoulders, a convex base, and a resharpened blade (Figure 24, m). This piece was recovered from 47cm depth in unit L15c. One biface fragment was found deeper in the same level (45-55cm) of unit L7d. No other tools were found below the rock zone.

Morphology of Retouched Pieces

The retouched pieces are subcategorized on Table 10. The occurrence of pieces in categories other than fine-retouched specimens is very sparce. Several of the fine-retouched pieces are small, and it appears that the diversity of pieces on this site (as compared to such sites as 34WN32, for example) suggests limitations of site function. However, with the limited excavation and areal coverage within the primary deposits of 34WN68, it is impossible to infer much from these attribute representations. It is perhaps noteworthy that the more interesting pieces, morphologically speaking, come from the 25-35cm level (Figure 24, h-k).

Tools from Trench II

Two tools were recovered during the excavation of Trench II. One is an end scraper which was found in the backdirt of the trench (Figure 24, n) near its west end. The second was a biface fragment (Figure 24, o), recovered from a depth of approximately 75cm below surface near the base of the rock zone in the hand excavated unit (between 3 to 4 meters from the west end of the trench).

Raw Material Varieties

Identifications of raw material varieties were

TABLE 10

Retouched pieces from 34WN68.

		Continuous Flaking			
		Obverse	Inverse	M. Bifacial	Alternate
Abrupt	Unilateral	5	–	–	–
	Bilateral	–	–	–	–
Fine	Unilateral	25	1	1	1
	Bilateral	7	2	3	1
Normal	Unilateral	2	–	1	–
	Bilateral	1	–	1	1

made according to the same criteria employed at 34WN32. There are complications in the identification of Kay County chert at this site, however, which render the data on lithic types tenuous. It is apparent that some of the Kay County chert turns a drak gray when heavily fired, and that some of the raw material has patches of gray mixed with the normal yellow color of the chert. Furthermore, a large number of the tools identified as Keokuk chert are representative of the lighter color phases of that material. Therefore, there is a strong factor of confusion between the two materials, especially when identifications are being made on very small spalls. The raw material percentages below the 35cm level consistently reflect a little over 70% Kay County chert (see Table 11). However, in the heavy upper portion of the rock zone and in the 0-25cm level the frequency of Kay County material is listed at close to 60%. It is in precisely the 25-35cm level that we may expect burning activity to be most prominently represented, and it is in precisely the 25-35cm level that the upper unit tools were produced. If it is in the heavily burned zone that a higher proportion of Kay County spalls take on gray color, then we would expect the frequency of occurrence of Kay County to drop—that is, a higher proportion of Kay County flakes would be identified as Keokuk chert. Inasmuch as the overall tool inventory does not seem to represent a firm multicomponent situation, it seems likely that the apparent shift in the relative proportions of the various source materials is spurious. Note also that Kay County non-tool elements represent 80% of the *surface* collection—the pink varieties stand out over the gray on the ground.

Summary and Recommendations

A number of questions may be approached by more complete excavation of 34WN68. These may be divided into several categories of questions involving culture-historic, cultural, environmental, and economic concerns. On the culture-historic front the primary concern of additional excavation of this site should be the acquisition of either (a) datable material in primary context, (b) a firm tie of the site to the geologic sequence of the Little Caney Valley. Such data might then be paired with a broader conception of the cultural units (s) that occupied the site to potentially extend our view of Little Caney prehistory into the first several centuries B.C.

The cultural questions, then, are a major part of the culture-historic assessment. It is apparent that 34WN68 at least has some specialized areas on it, albeit of ill-defined extent at present. Opening large horizontal excavations through the rock layer would tremendously expand our concept of what behaviors produced the accumulations of debris, the purpose of those behaviors in terms of a larger set of human needs, and ultimately perhaps define the scale of activity which produced the site. Were the deposits produced all at one time, for example, or were they an accumuation produced on many occasions? Indeed, are there areas which represent single activities which are discernable in the deposits? These questions simply require careful, expansive excavation.

Because of its position on the edge of the Little Caney valley, 34WN68 offers an exposure of the earliest valley sediments. There are hints of deep deposits on the site, and some care should be taken to determine the vertical extent of the cultural remains. While it is doubtful that there are deep tool deposits, important geologic information at least may be obtained by taking a larger unit, perhaps a two-meter square, to approximately twice the depth reached during this field season.

The preliminary information from this site suggests that it is a station for the production of blanks and tools from raw materials of the region, especially Kay County chert. Much of the chert, moreover, shows indications of heat treatment. The transportation of large quantities of raw Kay County material to this location was a task requiring considerable effort, as well as knowledge of regional resources. Even the local acquisition of sandstone, from as close as a few hundred yards west, and its transportation onto the site was no mean undertaking. Thus, the payoff for such effort should be recognizably great. It is doubtful that such benefit may be understood only in terms of the production of a superior knapping material; rather, 34WN68 probably has much more to do with the accessibility of the material on a regular basis. As part of any human organization there are elements first of planning and then of extant structure. It is probable that this site represents elements of both through the sustained coordinated practice of bringing material to a particular place for processing on a local quarry. Such a

TABLE 11

Raw material varieties from 34WN68.

		Kay County		Shidler		Keokuk		Other	
	N	N	%	N	%	N	%	N	%
Level-Surface									
Tools	43	29	–	1	–	11	–	2	
Non-tools	560	452	80.7	1	–	97	15.3	10	1.7
Level 0-25									
Tools	33	26	–	–	–	4	–	1	–
Non-tools	2071	1215	58.7	3	.1	852	41.1	1	.05
Level 25-35									
Tools	31	20	–	–	–	5	–	4	–
Non-tools	2672	1592	59.6	6	.2	1073	40.2	0	0
Level 35-45									
Tools	5	2	–	–	–	3	–	–	–
Non-tools	1501	1070	71.3	11	.7	420	28.0	0	0
Level 45-55									
Tools	2	2	–	–	–	–	–	–	–
Non-tools	389	292	75.1	0	0	97	24.9	–	–
Level 55-65									
Tools		–	–	–	–	–	–	–	–
Non-tools	107	82	76.6	0	0	25	23.4	–	–
Level 65-75									
Tools		–	–	–	–	–	–	–	–
Non-tools	9	7	–	0	0	2	–	–	–
Level 75-85									
Tools	–	–	–	–	–	–	–	–	–
Non-tools	11	7	–	0	0	4	–	–	–
Level 85-95									
Tools	–	–	–	–	–	–	–	–	
Non-tools	2	–	–	–	–	2	–	–	–

practice might imply simply that it is easier to make periodic large trips for material than many individual trips; however, it may also signal the quality of the relationship between people in two areas. Indeed, the lack of Keokuk chert may also signal lack of access. Thus, 34WN68 holds the potential information for the reconstruction of a local reduction sequence, especially involving biface production, a regional procurement system, matters of population duration and consistency of activity, and especially a critical element of the settlement systems of several time-periods in the valley. For just as the site is a resource to the early groups who created it, apparently, it is also a resource for later groups—perhaps several later groups—who came into the Little Caney valley to hunt, carry on other activities, or perhaps to live and work for longer seasons in the yearly round.

34WN64 Excavations

Site 34WN64, the Ahlden Mound, is a low rockmound of medium to small sandstone cobbles. The site is situated on the edge of the cuesta ridge running along the lower valley of the Copan Lake area on the west side of the river. The site was tested

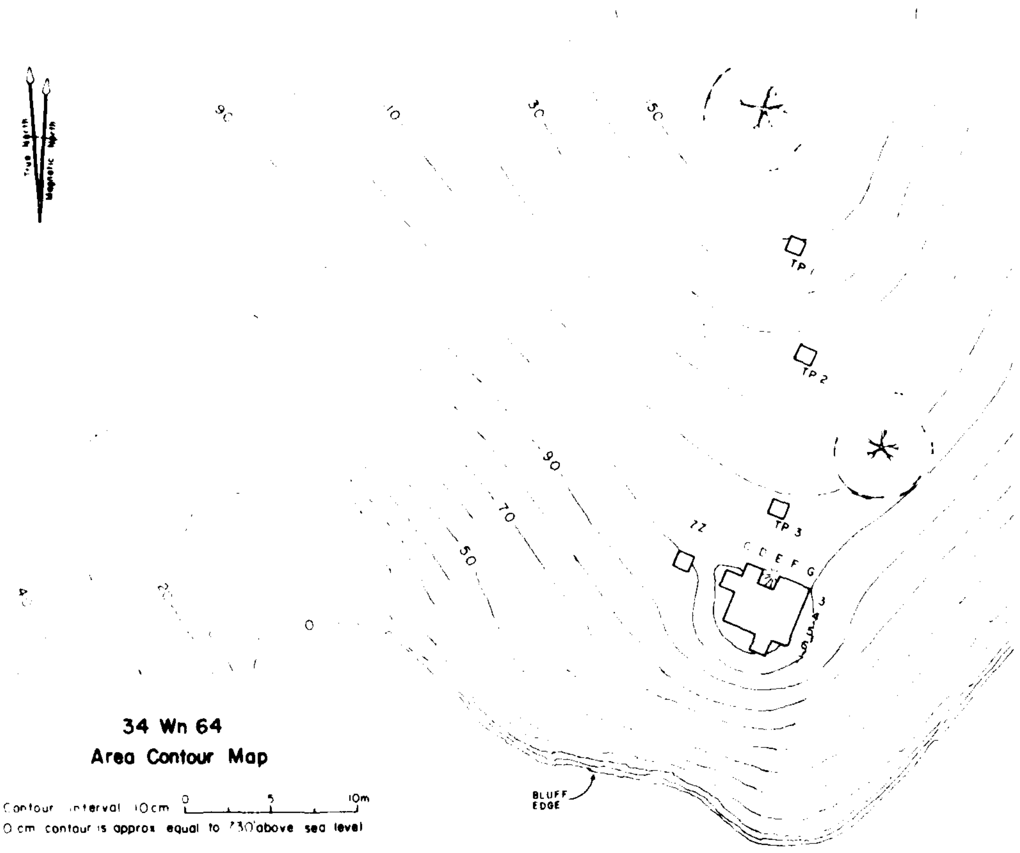


FIGURE 26 Excavation units at 34WN64

by Vaughn (1975) and not recommended for further work. The Laboratory of Archaeology undertook investigations at the site again in the interest of defining a discreet small component, and also for the purposes of developing an understanding of the conditions under which such rock mounds are produced. The site is situated on a short prominent extension of the cuesta which has immediate access to the valley through a gradual rill-slope located on the south. This is one of the only acess points to the valley from this particular upland area which lies north of the Long-shelter (34WN66) less than a mile.

Stratigraphy

The cultural deposits at 34WN64 consist of a low mound of sandstone cobbles which appear as a contour anomoly on the area contour map (Figure 26). The cobbles rest directly on sandstone bedrock which forms the resistant unit of the cuesta, and the source of raw sandstone materials. Three test pits were placed to the north of the main excavation to determine the extent of rock scatter under the ridge colluvium. In the northernmost of these pits no rock scatter zone was encountered on top of the bedrock. In Test Pit 2 a thin scatter of cobbles was encountered in the northwest quadrant, and in Test Pit 3 a thin scatter of rocks was spread across the bedrock surface. Thus, the basic stratigraphic units at the site involve (a) sandstone bedrock, (b) the main conical rock scatter with small peripheral scatters extending along the ridge to the north, and (c)

colluvium which covers the north part of the site and the north margin of the rock scatter.

Special Collection Techniques

Most of the excavation of 34WN64 was carried out using the same techniques of collection employed at other sites investigated. The sandstone cobbles were individually inspected for evidence of grinding and then discarded in a pile adjacent to the mound. Matrix was bagged by quadrant and returned to the laboratory for wet screening. In addition, a controlled collection of sandstone cobbles was taken for analysis of thermal effects. Samples of local sandstone were taken from bedrock context and from areas adjacent to the site. Sandstone slabs from the base of Test Pit 2 were also subjected to heat treatment as part of the investigation. Finally, a collection of oriented sandstone cobbles was collected from a small part of the upper 20cm on the northeast lateral margin of the mound (unit F3b, d). These materials were subjected to firing and refiring experiments for comparison with geologically obtained sandstones.

Recovered Artifacts

A total of [illegible] tools were recovered from 34WN64, including one point base, one point or knife tip, one point tang, five biface elements, nineteen retouched pieces, and two small pieces of ground sandstone. All of the tools except one of the biface elements and four of the retouched pieces are of Kay County chert with indications of heat treatment. The point base is an expanding stem element from a small dart (Figure 27, a). One of the biface elements appears to be the basal section of a hafted tool (Figure 27, b) of Keokuk material. The others are smaller fragments of non-diagnostic and rather undistinctive material. Two of the retouched pieces show fine notch edges, and all of the others evince short lengths of fine retouch (see Figure 27, c and d).

Non-tool elements are sparse in the deposits (Table 12). The upper three levels account for almost equal proportions of elements, while the base level of the mound shows a reduction in flake density. The 40-50cm level was excavated in Test Pit 1. For the entire excavation the total of chipped stone, non-tool elements is 397. Tools are mainly located in the upper 10cm of the undifferentiated deposits. Exceptions include one of the biface elements from the 30-40cm level, the point base, and another biface (Figure 27, a and b) from the 10-20cm level, and eleven of the retouched pieces from below 20cm.

Horizontal distribution of the debris and tools is nearly uniform, but with the small numbers of tools involved it is difficult to speak of patterns in any firm sense. Part of units E5 and F5 were comprised of the backfilled pit excavated by Vaughn, so the lack of elements in E5 is not surprising.

Overall, the sparse tool density supports the inference suggested by others in the region that rock mounds are associated with some kind of plant processing. The tools themselves do not indicate any of the assorted heavy scraping and point-fragment associations which would link the site to hunting activities, and the quantity and quality of debris indicates that the primary knapping activities at the site involved resharpening and other forms of tool maintenance. Biface sections appear to be mainly thinned pieces with edges similar to some of those encountered on the retouched pieces. At the same time, there are few ground stone elements. This suggests that the activities do not involve meal preparation or other final-stage plant processing work. Rather, the overall configuration of tools indicates some initial processing task. One possibility is that the site is a station for the heating or charring of tough nut hulls. In the tall tree stands of the valley edge are hickory and walnut trees, and it is possible that prehistoric nut resources were initially processed at the rock mounds along the valley edges. Such processing would involve small groups who would bring nuts to a roasting point and place them in rock-lined hearths which could then be covered with rocks and dirt to produce a kiln effect. Such practices would leave a high proportion of burned rocks and little other tool material, except a few biface or other knife spalls used in splitting hulls after the nuts were removed from the ovens.

Burned Rock Experiments

If 34WN64 were a nut roasting station such as that suggested in the preceding section, one would expect to find other indications of the activity beyond the rather simple tool distributions described above. Specifically, one could attempt to recover organic material related to the activity, or to measure

TABLE 12

Non-tool Element Densities, Counts, and Frequencies from 34WN64. Non-tool density is based upon number of elements per 0.1 cubic meter of excavated fill.

Level	Quads	Non-tool Density	Primary		Secondary		Tertiary		Bifacial Thinning		Chunk		Total
0-10	53	8.45	7	6.2	7	6.2	65	58.0	10	9.0	23	20.5	112
10-20	53	8.75	1	.9	4	3.4	63	54.3	7	6.0	41	35.3	116
20-30	49	8.24	4	4.0	3	3.0	66	65.3	4	4.0	24	23.8	101
30-40	44	5.82	2	3.1	4	6.2	30	46.9	10	15.6	18	28.1	64
40-50	4	4	1	25.0	0	0	3	75.0	0	0	0	0	4

organic variation on and off the site through chemical means. As it turns out, however, the site is exceptionally well drained, and no identifiable organic materials were recovered which were clearly attributable to the prehistoric period. Additionally, one might well expect the rocks themselves to provide indication of burning including either magnetic information or visible alterations of color, friability, or other attributes. Indeed, it is apparent that workers have rather glibly applied the term "burned" to the ferruginous sandstones of the region. For this reason a series of sandstone experiments were conducted to determine color change effects of natural sandstones of the ridge, and allow comparison of burned samples and archaeologically obtained specimens.

The experiments aimed at developing firm criteria for the identification of heat effects on the ferruginous sandstones of the locality, but certain findings of the experiments and fieldwork are of more general utility in approaching questions about the cultural activities associated with rock "mounds." On the basis of widely spread occurrence of rock features in he southern Plains and adjacent areas, it is apparent that many potential "functions" are associated with rock mounds, piles, scatters and the like. Within the Oklahoma region, in fact, there is considerable variety of concentration, areal extent, and artifact associations within this genre of sites. It is perplexing, then, that after many approaches ranging from enthusiastic to wary, we should have little to offer by way of explanation for "yet another" rockpile.

As a baseline study the samples of geologically derived sandstone were subjected to time and temperature controlled heatings. Five visually distinctive sandstones (Table 23) were burned in experiments such as that represented in Table 14. Readings of colors were taken immediately after pieces were removed from the kiln using a Munsell Soil Color Chart. Additional readings were taken as the materials cooled. In some experiments final stable colors were obtained only after several hours of cooling, although the most radical transitions of color were in the first few minutes after removal from the kiln. In Test I time and temperatures were much more tightly regulated. A total of 15 tests were accomplished on the raw materials designed to provide information on the following questions:

1. What color changes occur in sandstone when fired in medium to high temperatures and with a prolonged high temperature burn?
2. What are the precise points of time and/or temperature where color variations occur?
3. What is the reaction to heat of material with differentially colored natural states?
4. Is time a major factor in the alteration of color for any of the sandstones?
5. Will color changes observed under long-term firing conditions occur under very short firings at appropriate temperatures?
6. Are color changes cumulative with successive firings?
7. Does moisture of heated sandstone modify the final color of a burned piece?

The results of the experiments may be generally summarized in a series of statements which hold for the specific sandstones of the site:

1. Sandstone III appears not to undergo heat

TABLE 13

Initial Colors of Sandstone Varieties from 34WN64.

Variation	Basic Color Number	Basic Color Name	Interior Rind Number	Interior Rind Name	Exterior Rind Number	Exterior Rind Name
Sandstone Ia	7.5 YR5/8	strong brown	10 YR 7/6	yellow	2.5 YR4/6	red
Sandstone Ib	7.5 YR7/6	reddish yellow			2.5 YR4/6	red
Sandstone II	10 YR 4/4	dark yellowish brown	10 YR 6/6 or 7.5 YR6/8	brownish yellow reddish yellow	2.5 YR3/4	dark reddish brown
Sandstone III	2.5 YR3/2	dusky red	7.5 YR 7/6	reddish yellow	2.5 YR4/8	red
Sandstone IV	10 YR 4/4	dark yellowish brown	7.5 YR 6/6	reddish yellow	2.5 YR4/4	reddish brown
S IV lens	10 YR 3/3	dusky red				
Sandstone V	2.5 YR7/4	pale yellow				

NOTE: Recorded colors for rinds in the list above and through the tests may be less precise than the other readings as the rind sections are anywhere from one half to as small as one eight of an inch in width, with a gradation through the colors from yellows to reds.

TABLE 14

Test 1. Color changes of Sandstone Ia produced in a quickly warming kiln.

Time	Temp.*	Rock #	Color Number	Color Name
:05	450	1	7.5 YR 5/6 or 6/8	strong brown or reddish yellow
:10	660	2	7.5 YR 6/6 or 5/6	reddish yellow or strong brown
:15	930	3	2.5 YR3/4–5 YR4/6 or 8	dark reddish brown–yellowish red
:20	1140	4	10 R 4/4–5 YR 4/6 or 8	weak red–yellowish red
:30	1450	5	10 R 4/4–2.5 YR 5/8	weak red–red
:40	1400	6	10 R 2/2–2.5 or 5 YR5/8	weak red–red or yellowish red
:50	1375	7	5 YR 4/2–2.5 YR 5/8	dark reddish grey–red
:60	1400	8	10 YR 4/2–2.5 YR 5/8	dark greyish brown–red
:70	1400	9	10 R 3/3–2.5 YR 5/8	dusky red–red
:80	1425	10	5 YR 3/3–2.5 YR 5/8	dark reddish brown–red

*Temperature is recorded in degrees Farenheit.

alteration.

2. There is an alteration of sandstones II and IV at about 500 F.
3. There is an alteration of sandstones I and V at about 500 F, and a second alteration at about 1200 F.
4. Successive firings and water soaking do not appear to alter basic color readings unless differences in temperature are involved—temperature appears to be the controlling factor in the color alteration of the sandstones.
5. Variability of the geologic formation may

TABLE 15

Results of multiple firings of archaeologically collected sandstone cobbles at 34WN64.

No Specimens	Result at 500 F Firing	Result at 1200 F Firing	Assessment
7	no change	no change	Fired previously to 1200
24	no change	change	Fired previously to 500
8	uncertain result		Possibly fired to 500
2	change	change	anomolous
37	change	change	Unfired beyond 500
78 specimens			

make a prior color/burn assessments quite difficult, since many iron bearing sandstones of initially identical color undergo quite different heat alterations.

On the basis of these experiments the field collected archaeological specimens were subjected to heating tests to determine the extent of prior firing. Specimens were broken into several pieces and an attempt was made to classify each according to the basic category distinctions of the geologically collected specimens. This was made difficult by soil stains on the pieces which essentially permeated the materials. However, when fired the pieces reacted as did sandstones I and V. That is, they underwent two stages of color change at 500°F and 1200°F. The color changes of the archaeological pieces when fired, at the two temperatures are shown in Table 15.

These results support the inference that at least some of the rocks of the mound were fired to relatively high temperatures. The differential heat effects of the rocks in the sample suggest that the zone collected consisted of secondarily placed rocks. The lateral position of the collection is such that one might expect to find many dislocated rocks moved from more central "hearth" positions in the mound. Magnetic data for these sandstones might more adequately delimit clusters of in-place and disturbed rocks, thus allowing the accurate inference of fire structures. However, the frequency of each temperature range indicated for the rocks from the mound strongly suggests that the primary firings involve enclosed heat situations where a sustained, if brief, buildup of temperature is possible. In such a "kiln" the heat dissipation away from the source would produce differential fired effects. The pattern of fired rocks would be disturbed in opening, of course, although we might well expect the base and lateral rocks of such a hearth to remain sufficiently intact to allow identification.

These suggestions are only tentative, but have provided consistent information which fits well with the took kit and other considerations which lead to the formation of the nutting hypothesis. Fuller implications of the hypothesis must be dealt with in additional experimentation with the collections in the laboratory.

Summary

It is suggested on the basis of tool and experimental data that the Ahlden mound, 34WN64, was one of a number of nut-roasting stations along the ridgecrest of the Little Caney Valley, serving as a seasonal activity area in the broader settlement system of the valley. The certain dating of the site is impossible at the present time, but it is likely that such stations as these have been used in every recent archaeological period. The site would seem to fit well in the *basecamp/activity locus* settlement system which has been postulated for the Plains Woodland period (Vehik and Pailes, 1978; Keyser and Farley, 1979). However, the Plains Village activities in the valley, even if conducted on a less regular basis and from transitory basecamp situations, might also incorporate such nutting activities.

34WN30 Excavation

Site 34WN30 consisted of a scatter of materials in association with the Copan Paleosol, located on the north branch of Cotton Creek a short way

upstream from 34WN32. When the site was originally viewed by the staff of the laboratory of Archaeology, there were several indications of occupancy along the bank of the creek. During the excavation period, however, it became apparent that the scatter was indeed sparse. The primary cultural debris consisted of a sandstone scatter associated with charcoal, apparently a hearth used in some roasting process. In addition a number of bones were found scattered in the paleosol, including bison and deer bones, as well as small fragments of burned and unburned bone. During a 1977 visit to the site a cordmarked sherd (Figure 27, e) was recovered from the paleosol. During the 1978 excavation another sherd was recovered (Figure 27, f). The balance of tools recovered from water screening of all C quadrants of each 10cm level of the entire excavation unit (see Figure 28) includes only one side-removed thick-blank small point of Kay County chert (Figure 27, g), two point tips, and a core (Figure 27, h). Only very sparse debitage was recovered (7 additional non-tool elements).

In spite of the essentially negative results of intensive excavation at 34WN30, sufficient materials were recovered to assign the site to a late prehistoric, probably late Plans Woodland time frame. This assignment is based upon the sherds, points, and presence of the deposits in the Copan Paleosol. Further, the occurrence of bison bone at the site suggests the late ascription for the deposits. It is likely that more concentrated deposits were (or are) at the locality, although the broad scatter excavated constituted the only visible concentration suggested in the Cotton Creek bank. The site is essentially a continuation of 34WN29, scheduled for excavation during the 1979 season, so it is probable that buried cultural deposits extend well back to the south away from the creek bank.

Summary of the Investigations

The 1978 excavations at four sites in the Little Caney Valley resulted in an expansion of our knowledge of the culture-history and environmental history of the region, in spite of the fact that the information yielded at one of the sites was disappointing. In addition, the investigations involved experimental activities which expand our ability to deal with the complex rock features which are so common in the Copan Lake area and the region. Finally, the investigations underscored the need for the fuller development of our understandings of the protohistoric and historic record in the Little Caney Valley.

Chronology and Culture History

Of the four sites studied during the 1978 field season, only one has quite well-defined components. This site, 34WN32, yielded activity information pertinent to the Plains Village Period, as well as clear component segregation between Plains Woodland and Plains Village remains. The heavy but intermittent occupancy of this site spans the period from about A.D. 500 until the mid-eighteenth century. In particular, this site documents use of the Little Caney Valley during the early French contact period in Oklahoma. A more provisional culture-historic assignment was given to 34WN68, placing the beginnings of its occupancy at about A.D. 1. This site promises to be critical for understanding the local settlement system and regional ties of the peoples who used the valley throughout the late prehistoric time frame. Initial tests of the site indicate that it was a major processing place for Kay County chert, and opens the possibility that it was an essential local quarry for the material. Site 34WN64 cannot be assigned to a precise culture-historic period, but its position on the cuesta-ridge on the west side of the Little Caney Valley seems to link it with the rockshelters below it along the cliff, and its artifact inventory indicates that it served as an initial plant (probably nut) processing station. It is important to note that 34WN64 is located at the first access point along the ridge to the north of 34WN66 (Longshelter). Finally, it is probable that 34WN30 constituted a small Plains Woodland surface scatter similar in form to the Jackson-Falleaf site (34WN42; see Keyser and Farley, 1979: 26-31) although much smaller in extent and probably limited to a Plains Woodland occupancy.

Late Prehistoric Material Associations

The Plains Woodland component at 34WN32 is not intensive, and seems to represent an activity camp in the intensive basecamp/activity camp settlement system suggested by Vehik and Pailes (1978:216) and indicated by such sites as the Two

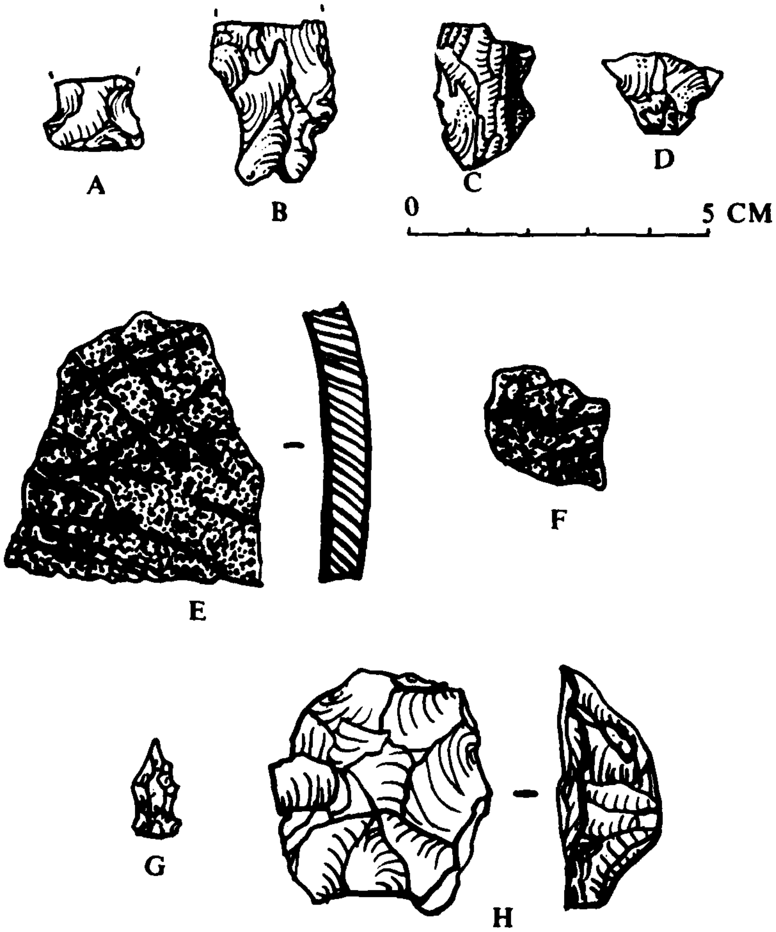


FIGURE 27: Artifacts from 34WN30. Expanding stem dart point base, a; basal section of a hafted biface, b; retouch pieces exhibiting fine notch edges, c and d; cord marked sherds, e and f; thick-blank point, g; core, h.

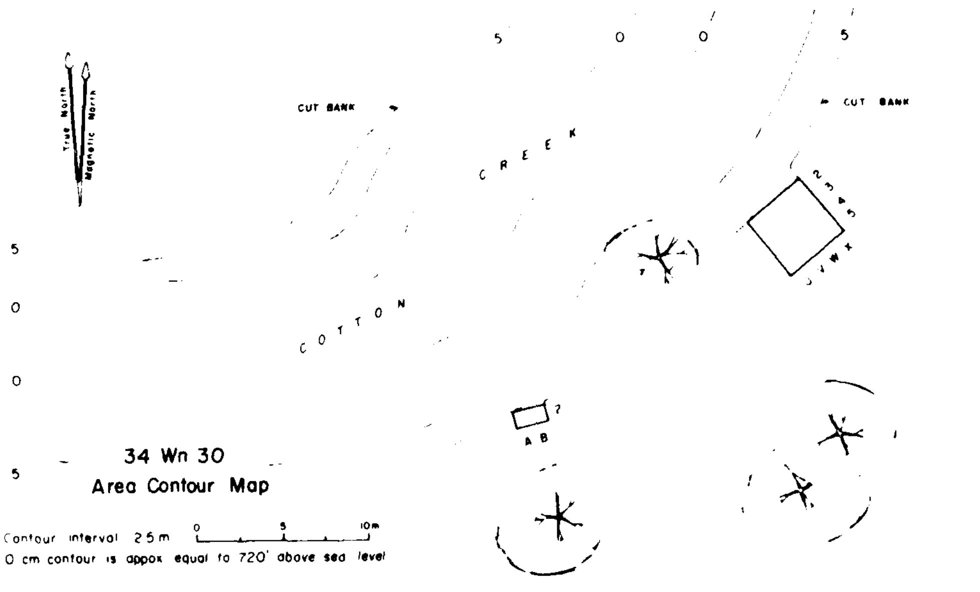


FIGURE 28: Excavation units at 34WN30

Goats Site (34WN71). A series of radiocarbon samples from 34WN32 have been submitted for analysis but results are still pending. Based upon artifact assessments it is suggested that the upper 20cm of the deposits should date at A.D. 800 to at least 1750. The deposits below 20cm include thick-blank small projectile points and clay-tempered cord-marked pottery. These materials should have a terminal date of A.D. 800, but might extend back several hundred years. Indeed, several deep levels yielded larger points and point fragments suggestive of an earlier Plains Woodland or Archaic use of the shelter.

The presence of cord-marked sherds in the upper 20cm of the 34WN32 might suggest a "Woodland" occupancy to some workers. These sherds are differentiated from those of the lower level by temper class, and there are even two shell-tempered cordmarked sherds in the collection. These sherds stand as an anomoly, if they are taken to be in direct association with Fresno and Washita points. Nonetheless, this is the situation which appears to exist at the shelter. One possible explanation for the sherd distributions is that there are mixed late Plains Woodland and Plains Village materials above the 20cm floor area. Such a situation might well arise in the context of strong cultural continuity over several generations. However, if there is mixing of the upper depositional zone at 34WN32, it must be rather complete mixing. It is also possible, however, that the upper level sherds were excavated from the floor at the time of establishment of the central hearth in the area of the main excavation at the site.

It might be debated that the presence of a gunflint in a rockshelter near the Kansas border with eastern Oklahoma is indicative of early Osage activity in the region. There are several material considerations which argue against this. First, the Osage gained access to European goods at a very early date, and were rather completely committed to guns as part of their leverage over adjacent groups (Bailey, 1973: 33-4). A single flint and a few beads seems too little for an Osage encampment. Additionally, the quantities of lithic debris at 34WN32 and the apparent activity emphasis seem too high to represent Osage activities. However, the formative elements of what were to be the Wichita had only limited contacts with either the French or Spanish during the early eighteenth century. This, coupled with the prominence of Kay County chert in late Copan Lake components suggests that the Plains Village affiliations of groups in the Little Caney River Valley were

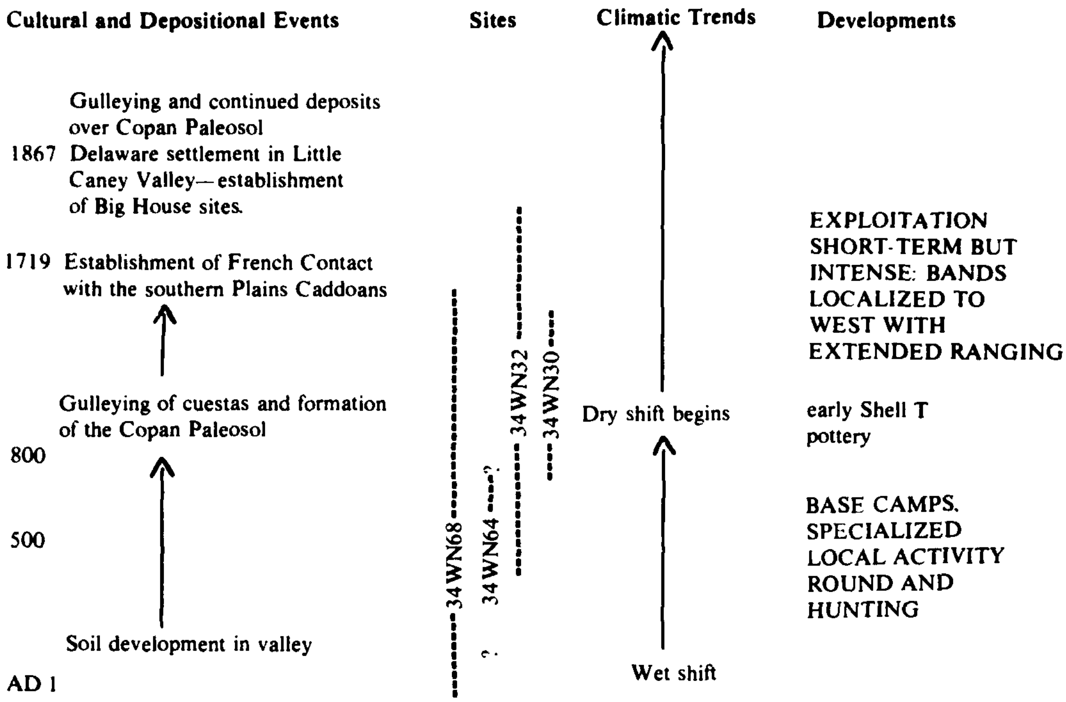


FIGURE 29: Associations of sites with major cultural, depositional, climatic, and developmental trends.

mainly to the west.

Resources and Human Ecology

Most of the paleoenvironmental evidence obtained during the 1978 field season was geologic in nature. The evidence for refinement of the paleoenvironmental history of the Copan Lake area was presented in an earlier part of this report. However, it should be restated here that the season's work allowed the suggestion of an upper valley depositional sequence and a scenario of gradually drying climatic conditions for the period during which the Copan Paleosol was buried, sometime after about A.D. 800.

However, it is also apparent that some gulleying of upland surfaces is quite recent, and perhaps exacerbated by the onset of agriculture in the Copan lake area. Early agricultural activities were most prominently implemented by Delaware people who moved into the Washington County area in 1867. Their adjustment to the land marks another part of the continuing human adaptations associated with the Copan Lake area. There is need to be wary of the potential confusion between climatic shifts in the valley and technological implementation of the nineteenth and twentieth centuries, at least when we deal with geologic information primarily.

Usable fauna were recovered from 34WN32, but the quantity of identifiable bone was minimal. It is apparent that bison, deer, and several small mammals and birds were exploited, and that at least limited meat processing and tanning took place at the site. The Plains village component looks rather like a seasonal small-game processing point which was repeatedly used. The activity analysis suggests, indeed that the area excavated is a rather coherent space dominated by a particular hearth, bone scatter and several individual tool concentrations. The critical difference between such specialized use of the shelters in the valley and more general use of the space in local hunting or gathering operations is that the constricted hunting pattern requires either more game or fewer people.

We have every reason to believe that Native American populations were stable and growing until European contact, but subject to impacts from subtle shifts in environmental potential. With a dry shift such as that suggested for the Little Caney Valley during the period immediately following about A.D. 800 or slightly later we might project relations such as those shown in Figure 29. Sites 34WN68 and 34WN64 are seen as potentially "humid" associated specialized sites, parts of a *basecamp/local round* settlement system of at least the early Plains Woodland period. The dry shift would necessitate, eventually, a broadening of resource utilization to more regional levels. It is this transition which probably is accompanied by such transformations of material culture as the introduction of shell-tempered ceramics, changes in point technology, and the like. More important, this shift is seen as accompanied by the greater exploitation of bison and other prairie resources, and so the late Plains Woodland should also be incorporated into the trend. Finally, a regionally oriented, less sedentary population directed itself to specific seasonal resources, adopting many elements of Plains exploitation patterns. On the protohistoric and early historic levels it is known that these groups underwent strong pressures toward tribalism, resulting in greater sedentism and identification in a local group and place.

Within these later patterns 34WN32 and perhaps 34WN30 fit, while the status of such specialized sites as 34WN68 and 34WN64 remain uncertain. The early impact of Osage people on the Little Caney Valley is uncertain at present, but it probably involved pressure for movement to the west and southwest on the part of inhabitants of the early seventeenth century. Thus it is doubtful that many long-term components of the Plains Village period will be found. Additional work at 34WN68 will help in developing information on this point, as will the investigations of remaining sites in other phases of the Copan Lake studies.

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